



UNIVERSITÀ DEGLI STUDI DI MILANO
FACOLTÀ DI MEDICINA E CHIRURGIA

SCUOLA DI DOTTORATO in
Scienze Fisiopatologiche, Neuropsicobiologiche
e Assistenziali del Ciclo della Vita

DIPARTIMENTO di
Scienze Cliniche “Luigi Sacco”

CURRICULUM
Neuropsicobiologia – XXIV Ciclo

TESI DI DOTTORATO DI RICERCA

**QUALITY OF EXPERIENCE DURING HOSPITAL REHABILITATION:
THE ROLE OF AUTONOMY AND PERCEIVED CHALLENGES**

Settore scientifico disciplinare: M-PSI/01

Tesi di Dottorato di:
Raffaela Daria Giovanna SARTORI
Matr. R08440

Tutor:
Chiar.ma Prof.ssa Antonella DELLE FAVE

Coordinatore:
Chiar.mo Prof. Roberto Lodovico WEINSTEIN

Anno Accademico 2011/2012

To my family

CONTENTS

ACKNOWLEDGMENTS	p.	4
ABSTRACT		5
CHAPTER 1: THEORETICAL BACKGROUND		7
1.1. Toward a bio-psycho-social definition of health		7
1.1.1 The contribution of philosophy		7
1.1.2. The modern medicine: from the biomedical to the bio-psycho-social approach to health		8
1.2. The relation between physical illness and psychological symptoms		10
1.2.1. The negative consequences of illness on psychological functioning		11
1.2.2. The promotion of health and well-being: the contribution of Positive Psychology		12
1.3. Psychological selection: framework to understand well-being		15
1.3.1. Optimal experience and psychological selection		15
1.3.2. The assessment of optimal experience in the health domain		18
CHAPTER 2: THE MOTOR REHABILITATION PATHWAY IN HOSPITAL		20
2.1. The Italian population health status		20
2.2. The motor rehabilitation process in hospital		20
2.3. Psychological aspects of hospitalization		24
2.3.1. Factors predicting psychological disorders		24
2.3.2. Factors promoting well-being		25
CHAPTER 3: METHODOLOGY		28
3.1. Experience Sampling Method (ESM)		28
3.1.1. ESM data coding and analysis		29
3.2. The Experience Fluctuation Model (EFM)		31
3.3. The advantages and disadvantages of online measurement		33
CHAPTER 4: THE SUBJECTIVE EXPERIENCE OF HOSPITALIZED PATIENTS		35
4.1. Introduction: aim of the study		35
4.1.1. Research Hypotheses		36
4.2. The Sample		36
4.3. Materials and Methods		38

4.4. Data analysis	pp.	39
4.4.1. Data analysis on Barthel Index (BI)		39
4.4.2. Data analysis on Experience Sampling Method (ESM)		40
4.5. Results: The general sample		42
4.5.1. Time budget		42
4.5.2. Average experience during daily activities		46
4.5.3. Experience Fluctuation in the EFM channels and perceived experience		47
4.6. Results: Daily experience and autonomy		49
4.6.1. Time budget		49
4.6.2. Average experience during daily activities		53
4.6.3. Differences in the average experience across groups		55
4.6.4. Perceived challenges in daily activities across groups		55
4.6.5. Multi-level model		58
4.6.5.1. Predictors of participants' quality of experience		58
4.6.5.2. Bivariate model		66
CHAPTER 5: DISCUSSION AND CONCLUSIONS		68
5.1. Discussion		68
5.1.1. The general sample		68
5.1.2. Daily experience and autonomy		69
5.1.3. Type of activity and level of autonomy as factors influencing the quality of experience		74
5.1.3.1. Predictors of participants' quality of experience: two-way interactions analysis		74
5.1.3.2. Bivariate model: the analysis of three way interactions		76
5.2. Strengths, limitations and future directions		77
5.3. Conclusions		78
REFERENCES		80
APPENDICES		97
Appendix 1. Experience Sampling Form		97
Appendix 2. Coefficients (standard errors) of the ML model		99

ACKNOWLEDGMENTS

This dissertation would have not been possible without the help of several people, who supported me during my years as a PhD student.

First, I would like to thank my advisor, Prof. Antonella Delle Fave, for her guidance and for having always encouraged me and supported my research ideas. Her knowledge and her love for research have inspired me during my doctoral studies.

There are many friends I would like to thank.

A special thank goes to Marta Bassi: I always admired her tenacity, and I learnt a lot by working with her. I also wish to thank Marco Marelli, for his help and for the great discussions we had together.

I want to thank all those who shared with me their PhD experiences, especially Mario Cocchi, Andrea Fianco, Margherita Fossati, Luca Negri, Melissa Pozzo, Cecilia Rassiga and Lawrence Soosai Natan. They are close friends, and I know we will still have a lot of fun together.

Of course I am also indebted to Simona Amenta, Andrea Bassanini, Eleonora Brivio, Sabrina Cattaneo, Stefania Comerci, Alberto Dionigi, Gabriele Galbiati, Paolo Garavaglia, Ombretta Geoni, Paola Landi and Giuditta Moscatelli. I will never forget the days (and nights!) they spent supporting and encouraging me, or just participating in my life. I hope I will have the opportunity to share with them positive experiences and fun again in the future.

To conclude, I wish to extend a huge thank you to my parents and my sister for their help. Moreover, a special thank goes also to Luca Rossi. They always supported all the decisions I made, and they never, ever asked me for anything in return. I know it is not so easy to tolerate a moody PhD student, so I need to thank them very much!

Last but not least I would like to thank grandma Linda. She has always been (and always will be) a big source of inspiration for me: without her I would simply not be the person I am today. This dissertation is dedicated to her.

ABSTRACT

In most studies on rehabilitation, well-being is synonymous with high levels of physical autonomy. However, little attention is paid to the psychological dimensions of rehabilitation and the role of subjective experience in promoting the patient's recovery and functioning. Several studies have highlighted that one of the core dimensions of well-being is the perception of high challenges in daily activities, matched with the individual skills and abilities. In order to design patient-centered programs this aspect should be evaluated jointly with physical autonomy.

Moving from these premises, the study was aimed at investigating the quality of experience reported by hospitalized patients engaged in a rehabilitation training. Specific attention was paid to the impact of daily activities and participants' level of autonomy on the promotion of well-being and resource mobilization.

Participants were 50 patients (30 women and 20 men aged 25-87) admitted to a Rehabilitation Unit for orthopaedic pathologies (80%), neurological disorders (18%) and respiratory syndromes (2%). Sample features were consistent with the hospital yearly pathology and gender distribution.

Data were collected through Experience Sampling Method (ESM), providing on-line information on the experience fluctuation during daily life. For one week participants carried an electronic device sending acoustic randomized signals 6-8 times a day. At signal receipt, they provided self-reports about ongoing activities and the associated experience. Likert-type scales measured cognitive, emotional and motivational psychological dimensions, including challenges perceived in the activity and related personal skills. Patients' autonomy was assessed through Barthel index (BI). Before data analysis participants were divided into three groups, characterized by low (LBI), moderate (MBI) and high (HBI) levels of autonomy respectively.

Answers to open-ended questions were coded and grouped into categories. The values of scaled variables were standardized before analysis. Analysis of variance was used to compare the quality of experience across groups. The experience fluctuation pattern related to the level of perceived challenges and skills was analyzed across activities. To examine the role of autonomy level and typology of activities in influencing participants' quality of experience, a series of regression analyses were run adopting a multilevel (ML) approach.

Findings showed that participants reported motor rehabilitation activities in one tenth of their self-reports, mostly associating them with the perception of high challenges, and in particular with optimal experience, characterized by concentration, engagement, high challenges balanced with adequate personal skills. Anxiety, characterized by high challenges and low skills, high engagement, but also control of the situation, was more frequently reported by LBI participants.

During the most frequent daily activities – personal care and leisure – participants reported instead low challenging experiences of apathy and boredom. Interactions were mainly associated with the perception of high challenges, and in particular with optimal experience.

ML showed that the type of activity represented a significant predictor of the quality of experience, while the level of autonomy had a modest impact on it. Cognitive dimensions of the experience, and perceived challenges and skills significantly increased during rehabilitation tasks, in particular for HBI patients. On the other hand, similar experiential patterns were identified in all groups in the other major daily activities, regardless of participants' level of autonomy.

Results suggest that the added value of physiotherapy as an opportunity for promoting psychological well-being should be more carefully taken into account in rehabilitation programs. On the opposite, the prominently negative experiences associated with the other daily activities point to the need for organizational changes supporting patients' autonomy and active resources mobilization.

CHAPTER 1

THEORETICAL BACKGROUND

1.1 Toward a bio-psycho-social definition of health

1.1.1. *The contribution of philosophy*

Definitions of health vary according to cultures and historical periods (Delle Fave & Bassi, 2007; Jones, 2004) undergoing constant changes over time (Levin & Browner, 2005).

Greek philosophers and physicians conceptualized the human being from a holistic viewpoint, considering individuals as unitary systems in interaction with the environment and the social context. According to this definition, health emerged as the adaptive and useful interaction between the physical, the psychological and the social dimensions, while illness occurred when external or internal causes produced a state of unbalance among the domains.

In V century B.C. the Italic school, in particular Alcmaeon of Croton, defined health as harmonious and homogeneous balance of qualities in the body and in general in the phenomonic world. A state of illness emerged when the prominence of a quality displaced the others. In the same period, in the school of Kos, Hippocrates described the main topic of medicine – the body – as a unitary entity composed by various organs and liquids. From Hippocrates's perspective, in the healthy body these elements were balanced between each other and with the environment, the social context or the climate: Breaking this balance produces a state of illness. Being aware of an individual's physiology and of the continuous interplay between internal and external conditions was the prerequisite for defining health as well as understanding illness. Particular attention was also paid to the communication between the doctor and the patient. Moreover, the therapy was addressed to the whole body; The role of the doctor was to reconstruct a complex equilibrium through adequate pharmacological and behavioral prescriptions.

Also Plato in the *Timaeus* highlighted the relevance of studying the human being in its complexity: “*Do not to exercise nor the soul without a body or a body without a soul, so that both [...] maintain balance and health*” (Plato, 360 B.C., 88b).

In the later centuries, however, the conceptualization of the human being and health was replaced by a dualistic vision, in which the body and the soul were considered as two different entities, with different characteristics and specific peculiarities. This perspective gave a strong impulse to modern medicine and its definition of health.

In modern philosophy, René Descartes stated that the soul (*res cogitans*) and the body (*res extensa*) were subjected to different rules, and postulated the existence of two different domains of

analysis (Descartes, 1647). He paid particular attention to *res extensae*, which were measurable and divisible into parts, assuming that each physical entity could be progressively divided into its smaller components, and the interactions between these components could describe the entire system functioning. Although René Descartes proposed a hierarchical distinction between the soul and the body, assigning to the natural sciences a higher level than to the spiritual ones, he emphasized the need for differentiating the methodology of investigation of these two separate domains of the human being. The study of the spiritual motions was discarded from the definition of rigorous science and was relegated to a marginal position.

In this historical and cultural context, the investigation models of the natural sciences were adopted in order to evaluate the general health status of the individual – grouping the physical, the psychological and the social dimensions together – without taking into account their differences and their reciprocal influence.

1.1.2. The modern medicine: from the biomedical to the bio-psycho-social approach to health

Following this philosophical trend, during the XIX century great changes occurred in public health. The Industrial Revolution, that led to a remarkable increase in workers' wealth and to the emergence of a strong middle class, and findings and discoveries in medical research played a crucial role in formulating the concepts of illness and health. The demonstration of a correlation between germs and disease and the introduction of the scientific method in clinical investigations gave an additional contribution to the already deep-rooted idea that the body structures and mechanism were separated from the processes underlying mind and soul functioning.

The *biomedical* approach that emerged and that is still widespread is centered on disease, classified through signs and symptoms and analyzed according to rigorous Evidence Based Medicine (EBM) rules. The model provides important advancements in understanding and treating disease, as well as in planning social and international policies aimed at granting adequate standards of health and assistance to all citizens. Through its application changes were observed in people's quality of life due to the decline of mortality rates from infectious diseases (Hernández-Quevedo et al., 2006; Friedman & Adler, 2011).

Several strengths characterize this model: a) the ability to verify the efficacy of intervention, due to the instrumental and the anatomic-functional countercheck; b) the possibility to test hypotheses with controlled randomized trials and rigorous methodology; c) the possibility to compare and spread each knowledge. The anamnestic and the therapeutic process are centered on pathology and

point to the best possible diagnosis and to the comprehension of risks and benefits connected with specific type of interventions (Arnold et al., 2005).

This biomedical approach dominated for a long time in medicine and it still exercises a deep influence. It conceptualizes health and illness as opposite poles of a continuum and, therefore, considers health simply as absence of disease. Relying on the primacy of science (Jones, 2004), this perspective conceptualizes physical conditions as objectively measurable (Arnold et al., 2005). The success of a therapy was, therefore, concretely evaluated in terms of life expectancy and expressed in years of survival (Delle Fave & Bassi, 2007). However, as Engel (1977) highlighted, the focus on the biological origin of pathology, the predominant role of physician and the objectivity of the cure process can appear inadequate parameters to approaching a complex phenomenon such as health. Moreover, the biomedical model addresses disease as independent from social behavior. The following attention to health as both an objective and a subjective condition, produced the need for developing adequate models of evaluation to better understand the dimensions and mechanisms involved in the process of individuals' perception of their health (Jones, 2004).

Moving from these premises, the *bio-psycho-social* model proposed by Engel (1977, 1982) emphasizes the active role of the individual both in the etiopathogenesis of disease and in the treatment process. This approach considers the patient as a person with a subjective interpretation of health, disease, quality of life, and well-being, and also a carrier of a specific cultural background and a member of a particular society. It addresses the issue of health complexity throughout the involvement of other disciplines besides medicine, such as psychology, sociology and anthropology. The model does not aim either at displacing the whole biomedical approach or at downgrading the role of the physician; Rather it aims at emphasizing the importance of patient's contribution to the process of prevention and cure, integrating the various disciplinary perspectives and broadening the intervention potential. This new theoretical perspective was strongly supported by several studies conducted on individuals' response to stressful events, such as disease, focusing on the role of individual characteristics, such as perception of the environmental challenges and adoption of adaptive coping strategies.

The researcher-physician Adolf Meyer proposed that stressful life events may be important in the etiology of illness (Meyer, 1948). His work was grounded into the pioneering efforts of Walter Cannon, who explained the relation between perceived stress, nervous system and endocrine system reactions, documenting the relation between emotional reactions (anger and fear) and related behavior (fight or flight response), increased levels of glycaemia, epinephrine, higher blood

pressure and respiration rate, and increased amount of blood pumped to the skeletal muscles (Cannon, 1932, 1942).

Hans Selye (1956) studied the physiological consequences of the response to threat, thus emphasizing that noxious stimuli were both emotional and physical, triggering a neuroendocrine response. He hypothesized that any type of threat would produce an arousal in the body defense system against noxious stimuli. However, stress would not necessarily lead to disease unless the adaptive responses were elicited for a prolonged period. On the other hand, Harold Wolff (1953) conceptualized stress as a response to perceived challenge or danger, rather than to a necessarily threatening or noxious stimulus. Facing stress with maladaptive coping strategies (constant worry or arousal) was considered a futile effort that would facilitate disease onset. These findings fostered research aimed at understanding whether stress phenomena mostly produce general weakening and vulnerability, or instead involve disease-specific disruptions of biological mechanisms.

Richard Lazarus (1966) showed that an individual's appraisal of the meaning of an event is crucial for determining if the event was experienced as stressful. Individuals experience stress when they perceive not having enough resources to face a given threat. Events, therefore, are not perceived as stressful if the individual perceives them as manageable (Lazarus & Folkman, 1984).

Studies emphasizing the role of perceived challenges in facing illness pointed to the importance of considering the biological aspects of illness as well as the psychological and the social dimensions. In line with these premises, the World Health Organization defined health a state of well-being at the physical, psychological and social level, rather than the mere absence of illness (WHO, 1946).

1.2. The relation between physical illness and psychological symptoms

Disease, in both its physical and mental components, represents a privileged topic of psychology. For decades, however, studies in this domain focused on individual psychological reactions to illness, on the negative consequences of facing illness, and on behavioral risks factors. More recently, a new approach was developed, aimed at emphasizing psychological resources and coping strategies in facing disease as well as factors promoting well-being and a good quality of life despite illness conditions (Delle Fave & Massimini, 2001; 2005).

1.2.1. The negative consequences of illness on psychological functioning

Illness can be considered as a stressful event in an individual's life. According to Lazarus' definitions (1966), stressful events can produce emotional distress which arises when individuals perceive that they cannot adequately cope with high threatening and environmental demands.

Several authors have examined the impact of chronic stress on cardiovascular disease over the long term (Krantz & McCeney, 2002). Stress affects the cardiovascular system and metabolism both through the nervous system with changes in heart rate, blood pressure and serum lipids (Sutin et al., 2010) and through the immune system, whose functioning is related in its turn to disease susceptibility (Kemeny, 2011). Among initially healthy people, symptoms of anxiety and depression have been found to predict incidence of coronary heart disease (CHD) in the long term (Barefoot & Schroll, 1996; Everson-Rose & Lewis, 2005; Ford et al., 1998; Kubzansky et al., 1997). In patients who already have clinical evidence of CHD, anxiety and depression predict recurrent coronary events and earlier death (Ahern et al., 1990; Frasure-Smith et al., 1995; Moser & Dracup, 1996; Steptoe & Brydon, 2009). Depression has also proved to be a risk factor for CHD among people with diabetes (Kinder et al., 2002). Other constructs related to depression, such as symptoms of exhaustion (Appels et al., 2000) pessimism (Scheier et al., 1999), and hopelessness (Everson et al., 1996; Everson et al., 1997) also predict more negative prognoses.

Research has also focused on the increasing vulnerability to infections, showing that lower levels of stress predicts greater resistance to infections, in particular to influenza virus (Cohen et al., 2007). These studies highlighted that proinflammatory cytokines trigger symptoms associated with upper respiratory viral infections (Cohen, 2005). Moreover, research examining wound healing as a function of perceived stress at the time of the wound (Kinz-Ebrecht et al., 2004) showed that patients reporting lower stress levels experienced faster healing.

Associations were also described between personality changes and health after the onset of disease. One of the most complex associations between personality and health involves neuroticism. Neuroticism or emotional instability characterizes people who tend to be anxious, high-strung, tense and worried, hostile and prone to depression. Neurotic people poorly cope with stress. They are more likely to feel and report symptoms related to distress (Barefoot & Schroll, 1996; Friedman, 2011).

1.2.2. *The promotion of health and well-being: the contribution of Positive Psychology*

In the last decades a new area of studies focused on the individual and environmental resources that can promote well-being and life fulfillment, outlining the constructive side of disease in spite of biological limitations. In line with the bio-psychosocial approach, the need for promoting health and well-being among ill people has been repeatedly stressed by the World Health Organization and by European and National institutions. This goal can be achieved through intervention strategies which take into account people's perspective and subjective experience of daily opportunities and obstacles. In order to pursue this goal, both WHO and the Council of Europe proposed to integrate the guidelines provided by the International Classification of Disabilities and Handicap (ICIDH, 1980) and the International Classification of Diseases (ICD, 1990) – focused on the evaluation of disabilities and function loss – with the classification of individual resources and capabilities, included in the recent International Classification of Functioning (ICF, WHO, 2001). The ICF conceptualizes each aspect of disablement as a dynamic interaction between individual features and environmental conditions. Disablement is understood as a variation of human functioning based on three dimensions, namely biological function/structures, abilities and skills in performing daily activities, and social participation. The analysis of individual functioning and capabilities, instead of deficits and limitations, allows for a better comprehension of the person's physical, psychological and social conditions while facing illness, also allowing for person-centered intervention programs that can effectively promote the best attainable physical, psychological and social well-being.

This shift from objective measurements to subjective evaluations, from absence of disease to presence of well-being, from cure to prevention and health promotion represents the core of positive psychology. This movement was officially launched in 2000, when Martin Seligman and Mihaly Csikszentmihalyi defined it in the issue n.55 of the *American Psychologist*. The purpose of positive psychology is the investigation of what promotes fulfillment of individuals and thriving communities, what makes for a life worth living, and how people can develop personal and collective resources at optimal levels (Seligman & Csikszentmihalyi, 2000).

Within positive psychology health is approached on the basis of the assumption that health and disease are considered not as opposite ends of a continuum; rather, they represent at least partially independent dimensions which can be simultaneously present and reciprocally influenced (Delle Fave & Bassi, 2007).

In the attempt to define well-being, two theoretical perspectives were developed – hedonism¹ and eudaemonism² (Ryan & Deci, 2001). The hedonic view equates happiness with positive emotions and satisfaction with life, whereas the eudaimonic view equates happiness with the human ability to pursue complex goals which are meaningful to the individual and society (for a review see, Delle Fave et al., 2011). Quality of life should be considered as a relative and subjective concept, involving perceived opportunities for action and skill development in the daily environment, social relations, and the setting and pursuit of goals which are not necessarily dependent on physical functioning or on material affluence (Fitzpatrick, 2000). Individuals develop a personal evaluation of what a good quality of life means, according to criteria such as values, beliefs, goal hierarchy and personality (Delle Fave & Massimini, 2004a). Objective indicators, and in particular physical health conditions, only partially influence this evaluation.

Consistent with this approach, Albrecht and Devliger (1999) found that people with serious disablement frequently rated their quality of life as excellent or good. Sodergren and Hyland (2000), asking people currently sick or recovering from disease to list the positive consequences of their illness, found that they reported answers related to improvement interpersonal relationships, positive personality changes, life reappraisal and restructuring. These results are related to processes such as benefit finding (Tennen & Affleck, 2002) and post-traumatic growth (Tedeschi & Calhoun, 1995). Positive consequences influence physical health in the long term (King & Miner, 2000). In a study conducted among patients with heart attack, Affleck and his colleagues (1987) found that participants who had reported benefits had better cardiac functionality in the long run and were less exposed to the risk of a second attack. Analogously, the perception of positive changes contributes to mobilizing the immune system defense (LeShan, 1994).

¹ The term edonia (ἡδονή) was introduced by the Cyrenaics. Aristipus of Cirene, pupil of Socrates, in order to identify well-being with pleasure according to the Socrates that things were good and right if they produce pleasure. The Cyrenaics edonism, however, was more drastic than Socrates' theory. From this perspective, pleasure consist of a "*slight movement*" of the senses that has value only as long as it is perceived. For Cyrenaics pleasure and the true form of happiness, is not conceived as a goal to strive with action and movements, but as a state of rest.

² The term eudaimonia (εὐδαιμονία) originates from the Nicomachean Ethic of Aristotle, a ten book probably belonging to his last period of life. The title derives from the fact that Nicomaco, Aristotle's son, edited the books. In the Nicomachean Ethic, Aristotle investigated which science should determine what happiness is and how individuals can achieve it. This goal should not be achieved by the political science, since "*happiness is desirable when belongs to a person, however it is better if it belongs to the nation or to the people (polis)*" (Nicomachean Ethic, 1,2). Well-being therefore is the goal to which every individual strain and the ultimate purpose is happiness. The latter does not derive from wealth or rewards, nor from physical pleasure, rather from the exercise of virtues, defined as the realization of internal potentials and resources of human being. The term eudaimonia means "presence of a good daimon" and identifies a way of being that realizes the ultimate purpose of the individual. In this sense, is the "peculiar work of the single individual", and derives from the cultivation of the peculiar abilities of the individual: "And happy is the man whose done to explain the activity of soul according to virtue, not for a short time but for a lifetime [...]. In a complete life one swallow does not make a summer or a single day: and so neither one day or even a short time make man blessed and happy" (Nicomachean Ethic, 1,6).

Emotions remarkably influence individual physiological functioning, as well as selection, memorization and cognitive evaluation process of the information related to the events that in the pathological process emerge from the perception of risk, control, perceived well-being and expectancies on the success or failure of the individual. Although positive emotional states can contribute to underestimate symptoms, in most cases they promote adequate risk perception (Isen & Geva, 1987), active research of solutions (Aspinwall & Brunhart, 1996) and coping strategies in facing difficult circumstances (Lazarus & Folkman, 1984).

Alice Isen (1987) highlighted that positive emotions mobilize cognitive and motivational resources, facilitate the flexibility of thoughts and creativity, promote the active search of new information and the motivation to action (Isen, 2000), improve the efficacy of problem-focused strategies and facilitate pro-social and helpful behaviors (Isen, 1999; Isen & Geva, 1987; Isen & Levin, 1972).

Studies focusing on well-being and quality of life among people with acute or chronic diseases addressed the importance of constructs such as sense of coherence (Antonovsky, 1987), self-determination (Deci & Ryan, 2000; Ryan et al., 2008), self-efficacy (Bandura, 1997) and resilience (Masten & Reed, 2002).

Sense of Coherence (SOC) explains how individuals forced to face stressful circumstances can positively adapt to them. SOC represent a general orientation towards reality, according to which people who believe that any life event or situation can ultimately be comprehensible, manageable and meaningful – at least to a certain extent – are able to find and bring order and organization in apparently ambiguous and disruptive situations (Antonovsky, 1987).

An important contribution to the study of health emerged from *Self-Determination Theory (SDT)* (Deci & Ryan, 2000; Ryan et al., 2008), which highlighted that the needs for autonomy, competence and relatedness can foster well-being in adverse health conditions, and can facilitate the adoption of preventive behaviors in healthy individuals (Sheldon et al., 2003). In particular, findings showed that adherence to medical treatments can be promoted by autonomy-supporting physicians, who encourage their patients to be actively emerged in the therapeutic process, involve them in the selection of treatments, and therefore promote self-monitoring and awareness in the process of recovery and cure (Williams & Deci, 1998).

Self-efficacy can be defined as the level of competence individuals perceive in facing a specific situation (Bandura 1997, 2004): It is based on individuals' perception of control of the situation and level of competence in pursuing and achieving goals. Studies among people in situations characterized by low controllability – such as permanent disabilities or the terminal stage of a

disease – showed that those individuals with high levels of self-efficacy mobilized competences and abilities typically used in problem-focused coping strategies, whereas those with low levels of self-efficacy hardly chose problem-focused coping strategies, good emotion management and realistic goals (Schwarzer & Fuchs, 1996; Merluzzi & Sanchez, 1997). Moreover, self-efficacy is related with the perception of internal locus of control: Individuals with high levels of self-efficacy face negative events in an active way, since they perceive themselves as directly responsible for their outcomes. The level of self-efficacy decreases in face of failures; this peculiar characteristic can have important implications in the management of illness, in particular when patients pursue unrealistic goals, thus facing repeated failures that can produce a decrease in self-efficacy levels.

Resilience is a state of optimal functioning and successful adaptation in spite of adverse conditions, such as psychological disorders, family conflicts or problematic social contexts (Masten & Reed, 2002). Resilience also plays an important role in the process of positive adaptation to illness (Rolland, 1994, 2005).

1.3. Psychological selection: framework to understand well-being

1.3.1. Optimal experience and psychological selection

Subjective experience comprises cognitive, emotional and motivational components, that undergo changes in relation with modifications in the internal and external conditions (LeDoux, 2002). Subjective experience is idiosyncratic, since it derives from the biological, neurophysiological and emotional-motivation configuration of the individual. Moreover, it is unstable, since it is exposed to changes in relation with the progressive and continuous increase of information and complexity that characterizes human beings. Subjective experience, therefore, guides the individual interaction with the environment, and influences the selection of information and daily activities (Massimini & Delle Fave, 2000; Delle Fave, 2004, 2007). Several studies highlighted that the experience features undergo changes in relation to variations in the levels of perceived environmental challenges and personal skills (internal conditions) as well as to changes in the ongoing activities (external conditions, Massimini et al., 1987; Massimini & Delle Fave, 2000; Delle Fave & Massimini, 2005; Delle Fave et al., 2011). These changes correspond to well-defined experiential states, recurrent across samples and conditions. Among these states, a peculiarly structured and complex condition was identified, labeled *optimal experience* or *flow* (Csikszentmihalyi, 1975; Csikszentmihalyi & Csikszentmihalyi, 1988; Massimini & Delle Fave, 2000). It is characterized by high levels of concentration, involvement, control of the situation, enjoyment, and perception of clear goals. Its core feature is the perception of high environmental

challenges balanced with adequate personal skills. Optimal experience is a state of balance and complexity, in which all psychological components - emotional, motivational and cognitive ones - show positive values, promoting high performance and well-being (Delle Fave & Massimini, 2005).

In particular, optimal experience is characterized by the following dimensions:

- a) Perception of high challenges and opportunities for action balanced with adequate personal skills in facing them (Csikszentmihalyi, 1990).
- b) Intense and focused attention on the present and the ongoing activity. Concentration on a limited set of stimuli, that are relevant for the performance of the situation they are involved in;
- c) Merging of action and awareness: While being absorbed in the activity, individuals are not aware of themselves as separate from the actions they are performing, thus promoting the spontaneous involvement in the activity.
- d) Loss of reflective self-consciousness: Individuals' lose awareness of themselves as separate from the world around them, and feel in union with the environment (Csikszentmihalyi, 1990, p.64).
- e) Sense of control over one's actions: Individuals experience the sense of exercising control, which conveys a feeling of security and power.
- f) Alteration of temporal experience: Time no longer seems to pass the way it ordinarily does, and it is typically perceived to pass faster than normal (Nakamura & Csikszentmihalyi, 2009).
- g) Clear goals: Individuals must know what they want to achieve. Goals can be proximal or have long-term meaning. Goals facilitate attention focus and commitment to meaningful activities.
- h) Clear rules and positive feedback about the progress being made: Positive feedback contains the message that the performance is going well and a specific goal has been met.
- i) Intrinsic motivation: Optimal experience entails doing something for the interest in and enjoyment of it, with no expectation of external gain or reward.

Optimal experience is prominently associated with structured and engaging tasks and activities (for an overview, see Delle Fave et al., 2011), and by virtue of its positive features it fosters the preferential cultivation of the associated activities with time, thus promoting the development of related skills, and the search for progressively higher challenges. From this perspective, optimal experiences promotes increasing complexity in behavior (Massimini & Delle Fave, 2000). Several transcultural research (Hormuth, 1986; Delle Fave & Massimini, 1988; Clarke & Haworth, 1994; Haworth & Evans, 1995; Larson & Verma, 1999; Persson et. al., 1999; Delle Fave & Bassi, 2003; Fianco & Delle Fave, 2006; Stokart et.al., 2007; Verma & Larson, 2003), showed the occurrence of

optimal experience in people's daily life, independent of gender, age, cultural background, occupation and level of education. This broad data collection (Massimini & Delle Fave, 2000) highlighted the pivotal role of optimal experience in the process of individual personal growth. By virtue of the characteristics of positivity, complexity and gratification of this peculiar state of consciousness, individuals tend to selectively replicate and cultivate activities associated with it. These activities tend to become preferential objects of focused attention on the task both in the short-term and in a long run (Massimini & Delle Fave, 2000). Through this process, optimal experience contributes to the *life theme*, defined as those groups of activities, values and general goals that every individual selectively cultivate in their life (Csikszentmihalyi & Beattie, 1979). Life theme is a core component of a broader selective process, defined *psychological selection*, which is a process of selection of environmental information, during which individuals preferentially replicate and cultivate subsets of opportunities for action available in the environment, thus influencing the horizontal and vertical transmission of bio-cultural information. Psychological selection results from the person's differential investment of attention and resources into daily activities (Csikszentmihalyi & Massimini 1985).

As previously highlighted, optimal experience is not centered on pleasure and positive mood: Individuals emphasize their involvement in high challenge tasks that require active participation, and the satisfaction that derives from the improvement of personal abilities. Optimal experience thus can be ascribed to the eudaimonic perspective, since it emphasizes the mobilization of resources, the development and implementation of abilities and skills, self-determined behavior, the building of social competencies and interpersonal relations, the pursuit of aims and activities which are meaningful for the individual and the society. This implies that a person can actively and voluntarily pursue activities, goals, or relations considered as important, but not necessarily leading to individual benefits and pleasure (Massimini & Delle Fave, 2005; Delle Fave, 2007)

This process of activity selection can have implications in the long term, since the level of involvement in activities can allow to predict future goals and cultivation of interests (Greene & Miller, 1996). Complex activities, such as study or demanding work, can be associated with optimal experience due to the high involvement and concentration that these tasks require. The quality of experience perceived in these activities can influence individuals' in the selection of their life goals (Delle Fave & Bassi, 2000).

1.3.2. *The assessment of optimal experience in the health domain*

In spite of a wide area of studies according to which physical disability is synonymous with lack of satisfaction and well-being (Weinberg, 1988), objective physical impairments do not prevent individuals from perceiving a good quality of life. According to the ICF guidelines, Saravan and his colleagues (2001) pointed to the need for considering that people with disabilities can perceive themselves as ordinary people coping with extraordinary circumstances.

Several studies highlighted the crucial role of optimal experience as an indicator of well-being. Like any other individual in good health, people with chronic health impairments, such as motor or sensory disabilities, do associate optimal experience with daily activities, and therefore, can build their own life themes, based on personal goals, meaningful challenges, and available skills (Delle Fave, 2010; Delle Fave & Massimini, 2004a).

Data collected among individuals with paraplegia and quadriplegia, and among blind persons showed that more than 90% of the participants reported optimal experiences in their lives (Delle Fave et al., 2011). Physical conditions influenced the kind of activities individuals could engage in. Blind people primarily reported media-related activities (reading in Braille, listening to music) and work tasks (typing and stuffing chairs). Participants with motor disabilities associated optimal experience prominently with the domains of work, leisure and to a smaller extent family relations. Relations were not only quoted within the family domain, they also emerged in answers related to work (talking/helping customers), and in free time (playing chess with a friend, social activities).

Considering the importance of optimal experience in the promotion of psychological well-being and physical and mental health (Delle Fave & Bassi, 2007; Massimini & Delle Fave, 2000; Steele & Fullagar, 2009), researchers investigated the potential for positive growth among persons who had physical disabilities in adulthood (Bassi & Delle Fave, 2007; Delle Fave, 2010; Delle Fave & Maletto, 1992; Delle Fave & Massimini, 2004a). For these individuals, the so-called process of *transformation of optimal experience* was identified. Physical impairments can make activities previously associated with optimal experience unavailable to the person, who is thus forced to modify optimal activities on the basis of the new physical conditions, or to look for new areas of commitment and skill development. Most participants successfully managed to identify new opportunities for optimal experience after the onset of disability, sometimes in areas very different from their previous interests, showing behavioral flexibility and resilience in adapting to the environment, and being able to pursue developmental goals despite biological constraints. With regards to the life experience before disability onset, leisure was reported as the most frequent optimal domain, with activities such as soccer, swimming, skiing, and dancing; after the onset

disease, this category was lower in frequency, and it primarily included hobbies like painting and playing the guitar.

According to the assumptions of adaptation theory (Brickman & Campbell, 1971), which states that within a few weeks after a trauma individuals tend to psychologically adapt to the new condition and that their average mood gets back to the levels reported before trauma, findings highlighted that after the onset of a chronic disease individuals can attain even higher levels of well-being and actively search for new interests, meanings and life goals (Delle Fave & Massimini, 2003). Optimal experience plays a crucial role in this process, supporting resource investment, skill development, and personal growth.

CHAPTER 2

THE MOTOR REHABILITATION PATHWAY IN HOSPITAL

2.1. The Italian population health status

According to a recent report of the Italian Health System (Ministry of Health, 2012) the Italian population is deeply involved in a process of obsolescence. In 2009 the age index, defined as the relation between the population over 65 and the population who is 15 years old or under, reached the amount of 144.5%.

In the current demographic setting, chronic-degenerative diseases related to the obsolescence process represent the major cause of death: In 2008 the circulatory system diseases – mostly involving the elderly and related to ischemic heart events and cerebrovascular diseases – and malignant tumors accounted for 70% of all death causes. Respiratory syndromes followed for both men and women (7% and 6% respectively). Accidents and injuries were prominent among men (5%) and endocrine and metabolic disorders (5% mostly diabetes) among women.

The last Report on Hospitalization rates (Ministry of Work, Health and Social Policies, 2009) compared to 2003 highlighted a decrease in the number of admissions, for acute diseases (-2.3%) and an increase for long-term hospitalization (3.18%). The 2009-2010 Report of the Ministry of Health (2010) attested a further decrease of 4.9% in relation to 2009.

During 2008 291.587 patients were admitted to Rehabilitation Units (Ministry of Health, 2009). About half of their patients (42.4%) were hospitalized for 23.5 days on average due to orthopedic problems; 23.5% required neurological rehabilitation and were hospitalized for 41.7 days on average; 16% were hospitalized for 18.2 days on average due to cardio circulatory diseases. The remaining 17.8% were hospitalized for factors “influencing the health conditions” (International Classification of Disease, ICD9-CM, 1979), referring, for instance, to patients with neoplastic diagnosis that need to follow a motor rehabilitation path in order to enhance their abilities and functions. The remaining 6.5% were admitted due to respiratory diseases, and they were hospitalized for 23 days on average.

2.2. The Motor Rehabilitation process in hospital

Motor rehabilitation programs are processes of problem-solving and education promoting patients' achievement of the highest attainable physical, functional and social levels of well-being through recovering and empowerment of functions and capabilities (Italian Ministry of Health, 2003). As highlighted in the Community Based Rehabilitation guidelines and in the Convention on

the Rights of Persons with Disabilities “appropriate measures aim at enabling persons with disabilities³ to attain and maintain maximum independence, full physical, mental, and social ability, and full inclusion and participation in all aspects of life...”(Art. 26, WHO, 2010).

The aim of any motor rehabilitation program is the retrieval of a lost functional competence, or the reduction of functional regressions. Physical interventions should aim at promoting patients’ abilities and autonomy in the context of their daily environment (Tesio et al., 1997; Molinari et al., 2007). Rehabilitation can occur at any stage in a person’s life, but typically occurs for limited periods and involves single or multiple interventions. It may range from basic interventions, such as those provided by community rehabilitation workers and family members, to more specialized interventions, such as those provided by therapists. Successful rehabilitation requires the involvement of all social services, including health, education, livelihood and welfare, thus confirming the need to be person-centered and goal-oriented. In the development of a rehabilitation pathway, a person’s preferences, age, gender, socioeconomic status and home environment need to be considered.

Rehabilitation is relevant to people experiencing disability from a wide range of health conditions. The term rehabilitation in this sense needs to be distinguished from the term habilitation (WHO, 2010). The process of habilitation aims at assisting those individuals who congenitally or in early childhood acquire disabilities and need to learn how to function without them. Rehabilitation programs aim at assisting those who experience a loss in function as a result of disease or injury and need to relearn how to perform daily activities in order to regain the maximal function.

Functional abilities are considered the core factors for determining the level of autonomy. From this perspective motor rehabilitation programs should comprise both physical interventions (the passive mobilization of an articulation, for instance) and interventions involving the person and her interaction with the environment (aids, removal of architectural barriers, for instance). Interventions that are not strictly rehabilitative, but can help the rehabilitation process, include pharmacological therapy, corrective surgery, and environmental adaptation (transports, financial support etc., Tesio, 2003; Molinari et al., 2007).

Recent studies in rehabilitation have focused on the evaluation of patient’s independence, that is the ability to autonomously perform Activities in Daily Life (ADL, such as to walk, to dress and

³ Disability is defined as the inability of autonomously performing the daily activities (Tesio, 2005). However, according to the International Classification of Functioning (ICF, WHO, 2001), disability is more generally defined as a constitutive element of the persons functional adaptation to the environment.

clean oneself, to ascend and descend stairs). These studies have considered the ability to perform ADL as a major indicator of well-being (Frihagen et al., 2008; Dawseon & Carr, 2001).

The repeated assessments of functions and physical performance during the rehabilitation training are defined “outputs”, while the final result is defined outcome, “meant as a result that affects the whole person, or even the interaction between the person and the environment” (Tesio, 2007, p. 516). Outcomes thus represent the patients’ perception of the rehabilitation consequences on their level of autonomy and on the acquisition of abilities useful to deal with daily challenges. A functional outcome is not the sum of many physical outputs. For example, “In the context of walking speed is not an outcome (it is more appropriately defined as output) of the rehabilitative process, while independence in walking [...] is an outcome” (Tesio, 2007, p. 523).

Rehabilitation outcomes are measured through indexes of performance such as the Barthel Index (BI, Mahoney & Barthel, 1965), the Functional Independence Measure (FIM, Granger et al, 1984), the Inability Status Scale (ISS, cit.) and the Disability Assessment Schedule (DAS, cit.)

Standardized and validated assessment scales or composite scores, such as the BI, are considered useful tools to evaluate the treatment outcome. In particular, composite scores provide a global evaluation of disability and autonomously focus on what the patients are able to do and how they actually do perform. They are, therefore, substantial indicators of the efficiency of the system in its complexity.

Although BI does not offer interpretative indications, it allows the identification of critical conditions and evaluation of the output of diagnostic and therapeutic procedures. However, while it provides a qualitative description of the seriousness of the disability, it does not assess patients’ feelings and thoughts in their complexity.

Moving from these premises, while the recovery of a lost function can be monitored through biomedical indicators, the rehabilitative components of a clinical program can be evaluated only in the light of psychological and social components as well.

The relation between the recovery of a function and the rehabilitation of a person cannot be rigorously predicted, since a non-linear causality characterizes this process (Delle Fave & Bassi, 2007). The predictability of the relation between organ damage and disability increases in as much as the organs and the altered functions cannot be vicariated either by other organs or functions, or by behavioral adjustments of the person or the environment. An old man with a leg prosthesis can walk out of his house or not. In order to determine the outcome of his rehabilitation training, the contralateral inferior art condition and the reduction of the pain, as well as psychological dimensions (motivation), and social conditions (architectural barriers) should be taken into account.

Rehabilitation activities, aim at teaching the patients how to reduce or limit disability level in order to allow them to move, eat, communicate, efficaciously interact with family members and the social environment.

The motor rehabilitation process begins with the impairment onset (Ministry of Health, 2003). Three stages can be identified. The first one begins during the acute phase of illness or when the congenital or acute disease is diagnosed. The second one begins in relation to the evaluation of the residual disabilities during the post-acute phase in the hospital and extra-hospital structures. In the second stage physiotherapy is crucial for preventing, curing and rehabilitating the motor functions. In particular, the aim of physiotherapy rehabilitation is:

- a) The reduction or removal of the pain caused by the disease;
- b) The normalization and the functional recovery of the dysfunctional or symptomatic neuro-muscle-skeletal structures;
- c) The recovery of functions in order to restore an adaptive daily life.

The third stage is characterized by health care in extra hospital services and aims at maintaining the functional independence acquired and the prevention of further involution process (Ministry of Health, 2003).

Consistently with the definition of health (WHO, 1946) and the guidelines provided by the Council of Europe (COE, 2010), the rehabilitation guidelines highlighted the need for moving beyond the International Classification of Disabilities and Handicap (ICIDH, 1980) and the International Classification of Diseases (ICD, 1990), both focusing on the evaluation of the disabilities and the lost motor and psychological functions. The recently developed International Classification of Functioning (ICF, WHO, 2001) defines the motor rehabilitation pathway as a process of problem-solving and education which allows the patient to achieve the highest physical, functional, emotional and social level with the lowest restriction of operative choices.

In line with the bio-psycho-social model (Engel, 1977) and the ICF guidelines (2001), rehabilitation trainings, besides the biological aspects, should take into account psychological and social factors in order to promote person-centered rehabilitation and patients' independence in the ADL. In line with this definition, in order to achieve the best level of efficacy every rehabilitation process needs to be structured on multiple goals since the best attainable level of autonomy in different domains is synonymous with autonomy of the person in its complexity. This could promote the best quality of life.

From a clinical viewpoint, besides the assessment of physical changes, the evaluation of subjective dimensions such as pain, fatigue, depression and health related quality of life are

essential to evaluate treatment effects and possible outcomes (McPhail & Haines, 2010; Sullivan, 2003; Wiklund & Talley, 2003).

2.3. Psychological aspects of hospitalization

2.3.1. Factors predicting psychological disorders

From a psychological perspective, several studies have pointed to the negative aspects of long hospitalization, highlighting an enhanced risk for the onset of anxiety or major depressive disorders, which can undermine the individual's active involvement in the process of recovery, including rehabilitation trainings.

Psychological effects of hospitalization can be observed immediately after admission and they progress rapidly (Morton, 1993). A functional decline from baseline occurs by the second day after admission and little improvement is achieved by patients' discharge, despite cure or repair of the condition that had caused hospitalization (Hirsch et al., 1990). An irreversible decline of functional status and a worsening in the quality of life were also observed (Hoenig & Rubenstein, 1991), usually unrelated to the disease progression or to specific treatments (Morton & Creditor, 1993). However, the major risk is that patients never return to the premorbid functional status. Several studies have emphasized that 30% to 60% of elderly patients with hip fractures are discharged from the hospital to nursing homes; 20% to 30% of them still reside in nursing homes one year later (Fitzgerald, Moore & Ditters, 1988; Furstenberg & Mezey, 1988), and only 20% attain their preoperative functional level (Jette et al., 1987).

Moving from these premises, attention was recently paid to the role of emotional disorders as a reaction to somatic illness (Snaith, 2003). Several studies have documented major depression in 15% to 23% of patients with stable coronary disease (Freedland et al., 2003; Carney et al., 1995; Steffens et al., 1999). Depression is associated with increased morbidity, mortality, functional impairment, occupational disability, low adherence to medications and higher cardiovascular risk (Steffens et al., 1999; Frasure et al., 1993; Carney et al., 1995; Ziegelstein et al., 2000). Recent studies in different countries showed that 20% to 30% of hospitalized patients met DSM-IV criteria for depression (Freedland et al., 2003; Montes Pena et al., 2011), without significant gender differences, in spite of the higher prevalence of depression among women in the general population (Weith et al., 1994).

In the last decades the use of the Hospital Anxiety and Depression Scale (HADS, Zigmond et al., 1983) has allowed the identification of clinical cases of anxiety disorders and/or depression among somatically ill non-psychiatric patients. Results showed that the presence of these disorders among

hospitalized patients widely varies, from 8% to 50% (Stiegelis et al., 2004; Burgess et al., 2005; Morasso et al., 2001). These findings could be partially due to the fact that single assessments cannot capture daily individual mood variations. However, a four-week longitudinal daily assessment of anxiety, depression and activities among hospitalized breast cancer patients, detected that for most patients who met criteria for anxiety and depression the day to day mood variability was rather low (Arving et al., 2008).

2.3.2. Factors promoting well-being

Besides the investigation of the negative aspects of hospitalization, the association between patients' satisfaction with hospital care and the empowerment of motor functions has been addressed in several studies aimed at evaluating the role of hospital communication and care system in promoting patients' perceived well-being and their active role in health recovery (Nguyen Thi et al., 2002; Baumann, 2009; Wright et al., 2002).

Although much satisfaction research has proceeded without a strong theoretical basis (Cleary & McNeil, 1988), satisfaction can be defined as the end result of a patient's comparison of ideal hopes, realistic expectations with actual care. Satisfaction is assumed to consist of a cognitive evaluation and an emotional reaction to the structure, process and outcome of services (Donabedian, 1980; Nguyen Thi et al., 2002).

Functional status and the outcome of rehabilitation seem to represent minor determinants of patients' satisfaction, which is unrelated to the severity of disease, as well as to the level of functional improvement during hospital stay (Heinemann et al., 1997). Similarly, bio-functional, socio-demographic and emotional variables have little influence on patients' perceived satisfaction with the rehabilitation services (Fuhrer et al., 1992; Bach & Tilton, 1994; Franchignoni et al., 2002). These studies rather pointed to the role played by satisfaction with healthcare per se in promoting patients' active adherence to treatment, as well as higher levels of fulfillment and active engagement in exercise therapy and other rehabilitation programs (Keith, 1998; Franchignoni et al., 2002).

Scientific literature also addressed the importance of considering the perceived quality of life in hospitalized patients, such as their sense of coherence (SOC), and the perception of self-efficacy beliefs in functional recovery. In a recent study, hospitalized cardiac patients reported a good quality of life (Bruscia et al., 2008) when compared to the general population (Burkhardt & Anderson, 2003). Results indicated that they were satisfied with all life domains including physical and material well-being, relationships, social, community and civic activities, personal development

and fulfillment, and recreation and independence. However, cardiac patients reported slightly lower mean values for Sense of Coherence (SOC) when compared to the general population values in Sweden (Holmberg et al., 2004), and Germany (Schumacher et al., 2000), thus showing that SOC was a powerful predictor of quality of life in this typology of patients.

The perceived quality of life during hospitalization and self-efficacy beliefs in functional recovery were also recently explored. Takeyachi and colleagues (2003) investigated the relationship between low back pain, functional status, general health perception, social participation, subjective happiness and patients' satisfaction. Subjective happiness was correlated with the general health perception rather than with the severity of pain and functional status. Restriction in functional status was not caused by pain alone, but also by fear-avoidance beliefs, which were identified as important psychological variables in patients with disability resulting from low back pain. In addition, this study showed that low back pain and functional status would more strongly affect mental rather than physical health. It also pointed to the necessity of considering social participation, subjective happiness and satisfaction with general health conditions as important outcome indicators.

Finally, a positive correlation of self-efficacy with self-care behaviors and with reduction of depressive symptoms was detected among patients with chronic arthritis (Lorig et al., 1989, 1993; Holman & Lorig, 1992) and after stroke (Robinson-Smith et al., 2000). Similarly, hip fracture patients with more confidence in their ability to perform rehabilitation protocols (rehabilitation therapy self-efficacy) experienced better functional outcome (Fortinsky et al., 2002). Moreover, patients reporting high levels of self-efficacy were more likely to retrieve their function six months later, and to return to pre-fracture locomotion levels. The positive association between self-efficacy and functional autonomy persisted even after controlling for depressive symptoms.

Lutz and Bowers (2005) highlighted that hospitalized patients report a multifaceted and complex experience; Besides the level of functional autonomy, it is therefore important to assess the consequences of the illness on the patients' daily hospital life, as well as physical and psychological resources, and perceived health status (Lutz & Bowers 2005).

The consequences of illness involve the whole person and primarily include mobility, cognitive abilities, communication, energies, and fatigue. Hospitalized patients spend a large amount of time and energy in activities, such as personal hygiene, eating and dressing, that are normally performed with no particular attention. This has secondary consequences that can affect the general health condition, and are strictly related to the outcome of medical treatment, such as side effects of pharmacological therapy, fatigue and loss of physical endurance due to a particular treatment. These

secondary effects can influence patients' quality of life during hospitalization and also after discharge, as well as the quality of life of their family members (Burns 1990; Davidoff 1990; Dejong & Brannon 1998; Dejon & Palsbo 2002).

In order to explore patients' psychological needs and resources during hospital rehabilitation, useful information can be derived from the analysis of their subjective experience during hospitalization. In particular, in the health domain studies showed that the identification of positive experiences under stressful circumstances can represent a good starting point to transform negative emotions and to support development and psychological adjustment (Folkman, 1997; Folkman & Moskowitz, 2000).

Moving from these premises, this study aims at investigating the quality of experience associated with daily activities among patients hospitalized in a Rehabilitation Unit, with the twofold purpose of shedding light on the cognitive, emotional and motivational aspects of patients' daily experience, and on the potential of daily activities as opportunities for facilitating the retrieval of motor functions and for promoting well-being through their association with positive experiences.

CHAPTER 3

METHODOLOGY

3.1. Experience Sampling Method (ESM)

In order to investigate the quality of every day experience, in particular optimal experience, Experience Sampling Method (ESM) was developed by Csikszentmihalyi and his collaborators (1977). The aim was to overcome the limitations of interviews and questionnaires which heavily rely on retrospective recall to gather information of optimal experience, and to obtain in real-time data on daily activities and social contexts and the related quality of experience. ESM is thus an ecologically-valid method of data collection in which participants' experience is repeatedly assessed at random moments over the course of time and in natural settings (Conner et al., 2009; Csikszentmihalyi et al., 1977; deVries, 1992; Hektner et al., 2007; Napa Scollon et al., 2003; Conner Christensen et al., 2003; Tennen et al., 1991).

Much literature is available on ESM psychometric properties and technical characteristics.

In a standard ESM session, participants are provided with an electronic device which sends random acoustic signals (beeps) from 8 a.m. to 10 p.m. Type of device, length of study, number of beeps and beep schedule all depend on the investigator's aims. In general, studies have shown that sending 6-8 random signals a day for one week is enough to gather a representative sample of individuals' daily experiences and activities (deVries, 1992; Hektner et al., 2007). However, ESM has also been used during longer periods of time, for example for over one month in a study with climbers in the Himalayan region (Delle Fave et al., 2003), and with repeated weekly sessions over one year in studies on twinship, friendship, and parenthood (Bassi & Delle Fave, 2009; Delle Fave & Massimini, 2004b).

At each signal reception, participants are asked to fill out a form, containing a standard set of open-ended questions and 0–12 Likert-type scales. The open-ended questions investigate thoughts, activities, locations, and social context at the signal reception. Likert-type scales ranging from 'not at all' to 'to the maximum' measure the affective (e.g. happy), cognitive (e.g. concentration, control of the situation), and motivational components of experience (e.g. wish to do the activity, goals). Perceived challenges in the activity and personal skills in facing them are also assessed (Massimini et al., 1987; Delle Fave & Massimini, 2005, Delle Fave et al., 2011).

ESM was translated into different languages, including Chinese (Moneta, 2004), Dutch (deVries, 1992), German (Hormuth, 1986), Japanese (Asakawa & Csikszentmihalyi, 1998), and Spanish (Ceja & Navarro, 2009). The Italian version is reported in the Appendix to this chapter.

Compared to the English original form (see Hektner et al., 2007, pp.294-297), the Italian ESF presents two major differences, one at the measurement level and one at the conceptual/semantic level. First of all, the semantic-differential scales measuring affect were substituted with Likert-type scales, in the wake of the empirical evidence that pleasant affects and unpleasant affects are distinct feeling qualities, and that it is thus not possible to describe them along a single bipolar dimension (Cacioppo & Berntson, 1994; Russell & Carroll, 1999). Secondly, the variables “challenges in the activity” was replaced by the item “Was the activity you were doing an engaging occasion for self-expression and action?”. This change was necessary after performing a pilot study among Italian respondents: The literal translation of challenge - *sfida* - entails strong reference to competition and physical contest, and was thus mostly identified in agonistic sport activities. Findings showed that the longer expression managed to capture a wider variety of optimal activities than the shorter one.

ESM has been widely used across cultures, in both cross-sectional and longitudinal investigations, with clinical and non-clinical samples (Conner et al., 2009; deVries, 1992; Hektner et al., 2007; Massimini et al., 1996; Trull & Ebner-Priemer, 2009). Several methodological studies investigated its reliability and validity, as well as participants’ compliance. Reliability was analyzed with test-retest split-half procedures (Csikszentmihalyi & Larson 1987; Hektner et al., 2007). Concerning validity, several studies correlated ESM data on the internal states with individual physical conditions. For example, Hoover (1983) obtained high correlations between physiological indices (cardiac and motor frequency) and the ESM variables “active” and “awake”.

Finally, participants’ compliance has been investigated over the last decades (Csikszentmihalyi & Larson, 1987; Hektner et al., 2007).

The ESM procedure can be successfully used with different typologies of participants, ranging in age between 10 and 85 years, and widely varying in their socio-demographic features. The rate of compliance shows some variations according to sample characteristics: Over a one-week ESM session, Csikszentmihalyi and Larson (1987) reported a signal response rate of 73% among blue-collar workers, 83% in a group of white-collar workers, and 92% among managers. Among Italian students the rate amounted to 68.8% (Bassi et al., 2010), and 83.3% among climbers (Bassi & Delle Fave, 2010).

3.1.1 ESM data coding and analysis

In the preliminary phase of data cleaning, forms that were completed more than 20 min after signal receipt were discarded from analysis in order to avoid distortions due to retrospective recall (Larson & Delespaul 1992; Hektner et al., 2007; Napa Scollon et al., 2003). In ESM questionnaires,

it is possible to ascertain the time elapsed between signal receipt and form filling-out because participants are asked to indicate the time when they were beeped, and the time when they started to fill out the sheet.

The answers to open-ended questions – ongoing activity, location and social context, physical sensations, perceived short and long term importance of the activity – were assigned numeric codes using extant manuals and were subsequently grouped into broad content categories according to functional criteria (Csikszentmihalyi & Larson, 1984; Hektner et al., 2007).

Since the ESM procedure is based on repeated self-reports, the values of each scaled variable were standardized (z-scores) before analysis, with mean=0 and standard deviation=1. Z-scores were created by subtracting each participant's mean value of the variable from the self-report's raw score, and then dividing the result by the participant's standard deviation. For each participant, after standardization, each variable will have as many z-scores as self-reports (except for possible missing values). In the ESM data organization, at this point two different approaches can be adopted in the treatment of scaled variables (Hektner et al., 2007; Larson & Delespaul, 1992): the beep-level and the subject level.

In the *beep-level* analysis, the unit of data organization is the self-report filled out at each signal reception. Given the big number of serial self-reports each participant fills out, the most important criticism of beep-level analysis regards the possible interrelationship between adjacent reports. However, in certain circumstances, violating the assumption of independence is almost unavoidable and may represent the best possible presentation of the data (Larson & Delespaul, 1992). Moreover, the random way in which self-reports are gathered weakens the dependence among serial data.

In the *subject-level* analysis, the participant is the unit of data organization. The ratings of each variable are standardized for each individual, and then aggregated scores (mean z-scores) are obtained. In this case, in the calculation of the mean score, N is no longer the number of self-reports but the number of participants. This kind of analysis is more conservative in that the assumption of independence is not violated, as it is in the beep-level analysis. However, aggregating data in this way squanders repeated measurements, increasing the probability of Type II errors (Larson & Delespaul 1992).

Choosing the most suitable approach in data organization ultimately depends on the researchers' aims. Their choice will also influence the kind of statistical analysis that can be performed (Conner et al., 2009; Hektner et al., 2007). Traditional OLS (ordinary least squares) strategies such as ANOVA or OLS regression basically require a subject-level organization of data, for the reasons reported above. Nowadays, however, the level of analysis has become irrelevant with the

introduction of the multilevel approach, that handles beeps and persons simultaneously (Bryk and Raudenbush, 1992; Goldstein, 1987). Multilevel modeling can successfully handle ESM nested data, with unequal numbers of observations across individuals and unequally spaced time intervals between observations. It additionally provides a way to obtain estimates of intra-individual and inter-individual variability, thus taking into account autocorrelations in data analysis.

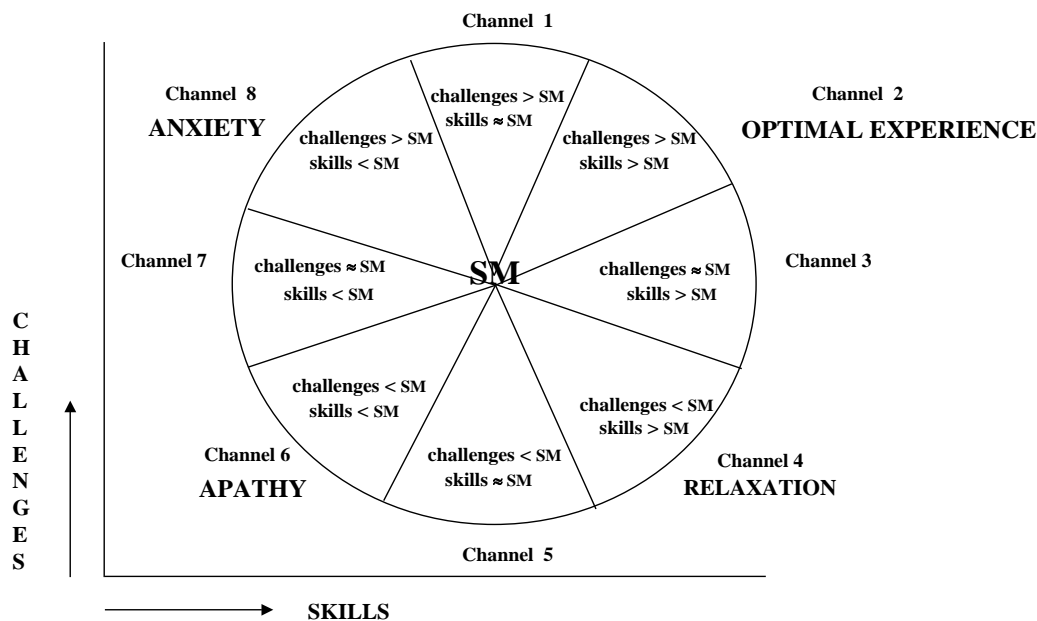
3.2. The Experience Fluctuation Model

After data standardization, the relationship between levels of perceived challenge and skill - on one side - and the quality of experience - on the other side – was explored through the Experience Fluctuation Model (EFM; Massimini et al., 1987, Figure 1). According to the standardized values (z-scores) of challenges on the y-axis and skills on the x-axis, the plan was divided into eight sectors of 45°, called channels, each one representing a specific range of ratios between the two variables' values. The center of the model (zero) corresponded to the mean of all participants' means for both variables (SM=subjective mean). In order to assess the quality of experience that hospitalized participants associated with different challenges/skills ratios, within each channel of the EFM mean variable scores were calculated by averaging the z-scores obtained for each variable. This calculation produced a single mean z-score of that variable for each channel.

Several studies using EFM (Clarke & Haworth, 1994; Delle Fave & Massimini, 1992, 2004a; Persson, Eklund & Isacson, 1999) identified four main experiences, corresponding to specific channels or ranges of ratios between challenges and skills: a) Optimal experience (channel 2), characterized by values of perceived challenges and skills higher than subjective mean; b) Relaxation (channel 4), associated with below-average challenges and above-average skills; c) Apathy (channel 6), characterized by below-average challenge and skill values; d) Anxiety (channel 8), associated with above-average challenges and below-average skills. These studies also converged in the description of these experiences: optimal experience showed globally positive features at the cognitive, affective and motivational levels; apathy, on the contrary, was identified as the most negative experience in daily life, a condition of psychic disruption and disengagement (Delle Fave & Massimini, 2005). Relaxation was characterized by positive mood and confidence but low engagement, and anxiety by high concentration and involvement, but low control of the situation and negative affect. The four remaining channels, identifying intermediate experiential states, were labeled “transition channels” (Delle Fave, 1996). In particular, the experience associated with channel 1, characterized by high challenges and average skills, was defined arousal. The experience associated with channel 3, characterized by average challenges and high skills, was

labeled as control. In channel 5, characterized by low challenges and average skills, participants reported a condition of low arousal defined boredom. Finally the experience associated with channel 7, characterized by average challenges and low skills, was defined worry (Csikszentmihalyi, 1997a; Delle Fave & Bassi, 2000).

Figure 1: The Experience Fluctuation Model (EFM)

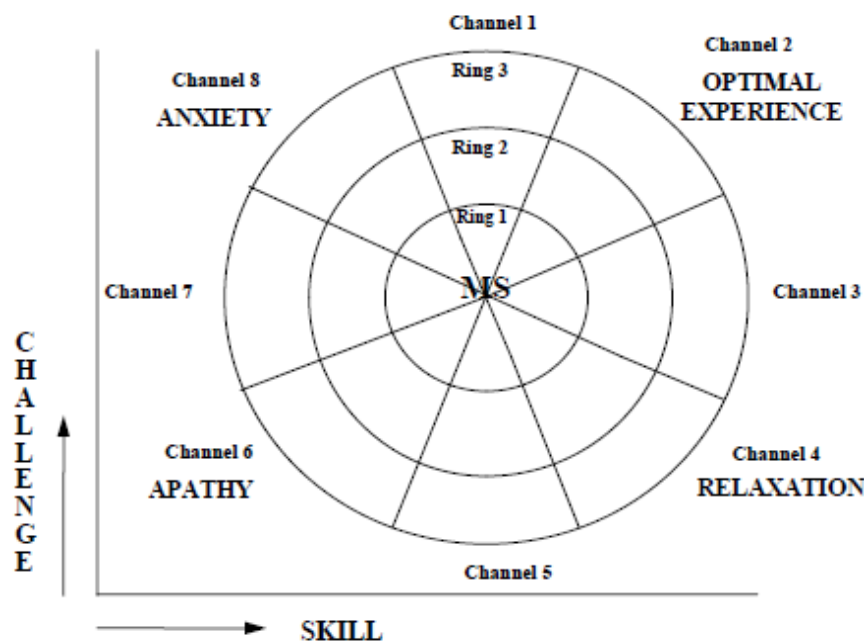


The EFM allows researchers to trace how experience qualitatively fluctuates across the channels and to identify possible individual fluctuation patterns; it can also allow researchers to analyze subjective experience from a quantitative perspective, highlighting how its characteristics can vary over time according to the reduction or increase of the levels of challenges and skills within a given channel. For this purpose, as shown in Figure 2, each channel is further divided into 3 areas, called *rings*, which identify ranges of distance of the values of challenges and skills from the center of the model (Delle Fave, 1996; Delle Fave & Bassi, 2000). Ring 1 ranges from 0 to 0.90 standard deviations from the center, ring 2 from 0.90 to 1.8, and ring 3 from 1.8 to 2.7. A fourth ring over 2.7 standard deviations has also been found; being quite rare, however, it has not been subject to systematic analysis.

As expected, moving from ring 1 to ring 3 - i.e. as the challenge and skill values increases, either above average or below average - the experiential profile associated with each channel tends to

become more definite, or intense. For instance, in channel 2 (optimal experience), the higher the opportunities for action and the abilities in facing them, the more positive and complex the associated experience. On the contrary, in channel 6 (apathy), experience gets worse and worse when challenges and skills plunge below the average. Also in channels 4 and 8, respectively associated with relaxation and anxiety, quantitative changes in challenges and skills levels are associated with more intense experiential profiles, with higher positive mood and lower cognitive investment for relaxation, and higher cognitive investment and lower positive mood for anxiety.

Figure 2. The experience fluctuation in the rings of the EFM channels



3.3. The advantages and disadvantages of online measurement

Compared to single-administration questionnaires, ESM presents a series of advantages in the analysis of subjective experience (Hektner et al., 2007; Napa Scollon et al., 2003). From the methodological point of view, it combines the ecological validity of naturalistic observation with the descriptive nature of diaries and the precision of scaled questionnaires. ESM allows researchers to gather information on individuals' behavior (Napa Scollon et al., 2003) and to relate them to external contingencies (situations and contexts) as well as to subjective experience.

The major advantage of ESM regards the real-time assessment of experience. Retrospective reports are subject to memory biases. For instance, individuals are more likely to recall or report experiences that seem more personally relevant (personal heuristics effect), that occurred more

recently (recency effect), that stand out as significant or unusual (salience or novelty effect), or that are consistent with their current mood state (mood-congruent memory effect) (Trull & Ebner-Priemer, 2009). Studies have revealed only partial overlapping between retrospective ratings of mood and behaviors and real-time assessments (Feldman Barrett 1997; Schimmack, 2003). Because of the short timelag between signal and response, ESM ratings validly reflect internal experiences and not individual's response styles (Schimmack, 2003) or social desirability (Hektner et al., 2007).

Finally, repeated measurement over time allows researchers to focus on both general psychological processes (nomothetic investigation), such as individual personality differences in experiencing emotions, and on intrapersonal processes (idiographic investigation) centering, for instance, on the individual experience fluctuation over the week (Hektner et al., 2007). The individual's week average score of a variable can represent the reference point to which to compare daily moment-by-moment scores for that variable, thus providing the within-person cut-off point that single-administration questionnaires do not have. The same is possible at the inter-individual level, by standardizing individuals' experience ratings (z-scores) and thus providing a common metric to compare experience across participants.

ESM also presents some disadvantages that researchers must take into consideration. Some of them pertain to participants, and others to situational issues (Napa Scollon et al., 2003). Concerning participants, self-selection bias and attrition – which are potential problems in all studies – are especially relevant in ESM research due to time length of studies and to the onerous task of randomly filling in questionnaires during the day. Additionally, ESM may not be suitable to study specific groups, such as illiterate individuals or people performing activities that cannot be easily interrupted (e.g. truck drivers or professional basketball players). Concerning the situation issues they regard the declining quality of data reporting after 2-4 weeks of data collection (Stone et al., 1991), and the possibility that individuals may not want to or could not respond to one or more signals (e.g. during rituals and religious ceremonies, or while playing soccer). Further, the ESM procedure itself could alter the course of daily events, first and foremost by disrupting individuals while performing a crucial activity (ex. athletes), by interrupting optimal experience while it occurs, and/or by leading people to pay unusual attention to their internal states and behaviors. However, studies have shown that 80% to 90% of US participants reported having a “normal” week and that ESM captured their week well (Csikszentmihalyi & Larson, 1987). In a German study, only 14% of participants reported that the signal bothered them in public, and only 22% complained about disruption of their daily routine (Hormuth, 1986).

CHAPTER 4

THE SUBJECTIVE EXPERIENCE OF HOSPITALIZED PATIENTS

4.1. Introduction: aim of the study

The present study aims at delving into the daily life and quality of experience of hospitalized patients within the theoretical framework of psychological selection; from this perspective, optimal experience is considered an indicator of well-being (Delle Fave & Massimini, 2001).

The quality of experience associated with daily activities will be investigated among patients hospitalized in an Italian Rehabilitation Unit. Findings will shed light on the cognitive, emotional and motivational aspects of patients' daily experience, and on the potential of daily activities in facilitating the retrieval of motor functions and in promoting well-being through their association with positive experiences. In order to evaluate the impact of disease severity on the daily quality of experience, participants were divided into three groups, based on their high, moderate or low levels of autonomy in performing the activity daily living (ADL).

The investigation, in particular, will focus on the following aspects: a) patients' time budget and perception of daily activities and contexts; b) quality of experience during hospital daily activities, with specific focus on the activities associated with optimal experience; c) relationship between level of autonomy and experience associated with daily activities; d) factors influencing participants' perceived challenges and skills during the daily activities.

In order to achieve these goals, data were collected through Experience Sampling Method (ESM, Hektner et al., 2007, Appendix 1) that provides repeated on-line self-reports on daily activities and associated experience. A thorough description of ESM was provided in Chapter 3.

Considering that the aim of hospital rehabilitation is the retrieval of lost physical functions or the enhancement of vicarious abilities, particular attention will be paid to the experience associated with rehabilitation activities. The evaluation of the experience associated with other daily activities, such as personal care and leisure, will shed further light on patients' resource investment, considering that these activities can promote physical and psychological health both in the short term and in the long run (Larson & Delespaul, 1992). Attention will also be paid to social interactions, mainly involving other patients, and less frequently family members and the hospital staff. Scientific literature highlighted the pivotal role of relationships in promoting well-being, and their positive effects on the development of social competencies (Burleson, 2003; Ryff & Singer, 2008).

The experience fluctuation pattern related to the values of perceived challenges and personal skills will be analyzed across activities through the Experience Fluctuation Model (EFM, Massimini et al., 1987, Chapter 3).

4.1.1. Research Hypotheses

Concerning the first aim (a), we hypothesized that the daily activity distribution would be substantially similar across participants; however, according to their different level of physical autonomy participants, would perform the daily activities in different places and social contexts. Concerning the second aim (b) we expected that the experience associated with the main daily activities would differ according to the complexity of these activities, and to patients' perceived challenges in performing them. In particular, we expected that motor rehabilitation activities would be preferentially associated with high challenges, and specifically with optimal experience. As for the third aim (c) we expected to detect a relationship between the quality of experience in daily activities and participants' level of autonomy, as factors potentially influencing patients' quality of experience. In particular, we hypothesized that patients with higher levels of autonomy would report a better quality of experience during daily activities than participants with lower levels of autonomy. Moreover, we expected that during rehabilitation activities patients with higher levels of autonomy would report a better quality of experience. Concerning our last aim (d) we expected to detect a relationship between perceived challenges and skill, type of activity and level of autonomy. In particular, we expected that patients would report higher levels of challenges and skills during rehabilitation activities than during the other daily hospital activities. Moreover, we hypothesized that rehabilitation activities would be associated with higher levels of challenges and skills by individuals with higher levels of autonomy.

4.2. The sample

Participants were recruited in the Rehabilitation Unit of Hospital Luigi Sacco of Milan, between January 2008 and June 2010. Patients able to write and with normal or correct-to-normal visual abilities were included in the sample. Meetings with professional staff allowed to collect information on the clinical condition of each patient in order to identify exclusion criteria. Patients with hypoacusia, neurological disorders as apraxia, aphasia, unilateral neglect, and mental and psychiatric disorders such as major depressive disorders and obsessive-compulsive disorder, were not involved in the study.

One hundred and three patients were initially recruited, 63 women and 53 men. All voluntarily took part in the study. Patients' pathology and gender distribution was consistent with the yearly hospital admission figures (Italian Ministry of Health, 2009).

Ninety-three patients were initially involved in the study. Among them, 21 patients (22.5% of the participants recruited) decided not to be enrolled in the study after the briefing session because they wanted to be fully concentrated in their rehabilitation training, and assumed that ESM would have subtracted time to these activities. Nineteen participants (20.4%) dropped out after a few days for problems related to perceived difficulties in filling out the forms; 3 patients (3.2%) faced acute physical problems during the sampling week and they had to interrupt participation.

Participants providing valid data were 50 patients, aged 25-87 (mean age=63.92 SD=12.61). Among them, 20 were men aged 29-85 (mean age=63.7 SD=14.17) and 30 were women between 25 and 87 (mean age=64.1 SD=11.71). Patients had been admitted to the Rehabilitation Unit for: a) orthopaedic problems, prominently hip fractures, coxarthrosis, and gonarthrosis (40 participants, 80% of the total sample); b) neurological disorders, prominently strokes (9 participants, 18%); c) respiratory syndromes (1 participant with BPCO).

Concerning family status, 62% of the participants were married, 14% were single or unmarried, 14% were divorced and the remaining 10% were widowers. As for the education level, 52% of the participants had a secondary school degree, 38% a high school degree and 10% a university degree. During the survey, 72% of the participants were entitled to retirement pension, and 28% worked, prominently as office employees.

For each participant the BI total score was calculated at hospital admission (T1), during the sampling week (T2) and at hospital discharge (T3). Patients were then divided into three groups, based on their level of autonomy in the ADL at T2 (Shah et al., 1998).

The first group ("HBI") comprised 7 women and 8 men aged 35-85 (mean age=65.4 SD=10.8) with a high BI total score (between 91/100 and 100/100). These participants were able to walk autonomously or with crutches, to eat and dress by themselves, and they had urinary continence. Among them, 78.9% had an orthopedic pathology, 14.3% a neurological disease and 7.1% a respiratory syndrome.

The second group ("MBI") comprised 17 women and 7 men aged 25-87 (mean age=64 SD=13.71), with a moderate BI total score ranging between 61/100 and 90/100. They used a wheelchair for aid, but they were able to walk if supervised by the physiotherapist. Most of them had urinary continence, and they were independent in eating and dressing. However they needed

some help in doing complex movements like cutting food or rolling on their socks. The vast majority (80.8%) had an orthopedic pathology and the 19.2% a neurological disease.

The third group (“LBI”, with a low total score between 21/100 and 60/100) comprised 6 women and 5 men aged 29-78 (mean age=63 SD=13.4). They needed a wheelchair for aid, some of them did not have urinary continence, and they were not autonomous in eating and dressing. Most of these participants (90%) were hospitalized for an orthopedic pathology and 10% for a neurological disease.

No significant gender and age differences were detected across groups.

Similarly, the response rate – in terms of ESM valid forms filled out by each participants – did not differ across groups. Out of the 1547 valid ESM forms obtained, 437 were provided by HBI patients (29.1 self-reports on average per participant), 739 by MBI patients (30.8 self-reports on average) and 371 by LBI patients (33.7 self-reports on average).

4.3. Materials and methods

For each participant the medical staff completed the Barthel Index (BI, Mahoney & Barthel, 1965), a 10-item measure of functional and motor independence. BI comprises two items about personal care (wash face, comb hair, shave, and clean teeth) and bathing; 6 items to assess feeding, getting onto and off the toilet, ascending and descending stairs, dressing, controlling bowels, and controlling bladder; finally 2 items to evaluate the ability of moving from wheelchair to bed and returning, and walking on a level surface. The functional independence index is a cumulative score calculated by summing each item score.

Participants were administered Experience Sampling Method ESM (Hektner et al., 2007). They were contacted and recruited during individual meetings. During the briefing session, the electronic device and the booklet of questionnaires were provided to each participant, together with detailed instructions for the compilation of the questionnaires. Participants were asked to fill-out a sample form questionnaire: their doubts were addressed and contact references were given in order to allow patients to ask further questions to inform researchers about technical or personal problems during the sampling week. In line with the standard ESM procedure, participants took part in the study for one week, at the end of which a debriefing session allowed them to report difficulties and problems.

During the sampling week, participants carried an electronic device sending acoustic randomized signals 6-8 times a day from 8 a.m. to 10 p.m. At each signal reception, they were asked to fill out a form, containing a standard set of open-ended questions and Likert-type 0–12 scales (Massimini et al. 1987; Delle Fave & Massimini 2005, see Appendix 1).

4.4. Data analysis

4.4.1. Data analysis on Barthel Index (BI)

In order to adequately investigate the quality of experience during hospital rehabilitation, the increase of patients' level of autonomy in relation with the length of hospitalization (number of days spent in hospital before psychological assessment) should be taken into account. Since the aim of any rehabilitation training is the retrieval of motor functions and the achievement of higher levels of physical autonomy, participants' BI is expected to increase during hospitalization. For this reason, as previously reported, BI was assessed at hospital admission (T1), at the beginning of the ESM week (T2) and immediately before discharge (T3).

BI is composed of 10 items with varying weights (Mahoney & Barthel, 1965). Autonomy in personal toilet and bathing is evaluated through two 2-score scaled items (0 and 5 points); the assessment of feeding, getting onto and off the toilet, ascending and descending stairs, dressing, controlling bowels, and controlling bladder is based on 3-score scales (0, 5, and 10 points); finally two 4-score scaled items (0, 5, 10, and 15 points) evaluate moving from wheelchair to bed and returning, and walking. The BI is a cumulative score calculated by summing each item score. The BI scores are multiples of 5, ranging from 0 (completely dependent) to 100 (independent in ADL). Higher scores indicate a higher degree of independence. A BI total score between 0 and 20 suggests the total dependence of the patient. A severe dependence is identified by a total score ranging between 21 and 60. A total score between 61 and 90 identifies a moderate level of independence. Finally, a BI score ranging between 91 and 100 indicates the total independence of the patient in ADL.

For each participant in this study, the BI total score during hospitalization increased as indicated by BI assessment at T1, T2 and T3. For the majority of participants, the sampling week coincide with the intermediate phase of hospitalization, equally distant from both admission and discharge. This group comprised 80% of the HBI patients, 83.4% of the MBI and 27.3% of the LBI ones. Therefore, the comparison of patients' BI at T2 – according to which they were assigned to a BI group –with BI at T1 and T3 allowed for a better comprehension of participants' rehabilitation stage during the ESM week. To this purpose, a multilevel approach was adopted. Multi-level models were performed taking participants as random effect (Hox, 2002). Fixed effects comprised a two-way interaction between group and time. As for HBI patients, at T2 their BI total score was significantly higher in comparison to the BI total score calculated at T1 ($t=-12.36$, $p<.001$), whereas no significant difference was found when comparing T2 with T3. No significant difference was detected between T2 and either T1 or T3 for the MBI group. Finally, concerning LBI patients, at T2

their BI total score was significantly lower than at T3 ($t= 14.82$, $p<.001$), while no significant difference was detected in comparison with T1.

The BI total score used for the group assignment was also correlated with the number of days already spent in hospital at the week of data collection. A positive correlation was detected between the BI total score calculated during the sampling week and the number of days participants had already spent in hospital: The higher the BI score, the farther the patients were along their rehabilitation pathway ($t=5.99$, $df = 48$, $p<.001$).

4.4.2. Data analysis on Experience Sampling Method (ESM)

AS for ESM data, forms completed more than 20 min after signal receipt were discarded from analysis in order to avoid distortions due to retrospective recall (Larson and Delespaul 1992).

Through this selection, 403 questionnaires out of 1950 were dropped (20.7%). The final data set included 1547 valid questionnaires (30.9 self-reports per person on average), corresponding to 63.1% of the 2450 forms expected (6-8 beeps a day for one week for 50 participants).

The answers to open-ended questions – ongoing activity, location and social context, physical sensations, perceived short and long term importance of the activity – were assigned numeric codes using extant manuals and were subsequently grouped into broad content categories according to functional criteria (Csikszentmihalyi & Larson, 1984; Hektner et al., 2007). Chi square procedure was used to compare the frequency distribution of the answers between groups.

In order to guarantee a conservative analysis of the scaled variables, the scores of each variable were standardized before analysis for each participant. Aggregated scores (mean z-scores) were calculated at the beep-level, in which the unit of data organization is the self-report filled out at each signal reception (Larson & Delespaul, 1992; Hektner et al., 2007). The investigation of the daily hospital experience focused on affective, cognitive and motivational dimensions across the daily activities. Moreover, the quality of experience associated with the main daily activities was also analyzed for each group of patients. *T*-tests were performed to assess whether z-scores significantly differed from average within the total sample.

The investigation of the daily hospital experience focused on affective, cognitive and motivational dimensions. For the purpose of this study, and in line with international ESM literature (Csikszentmihalyi et al., 1993; Csikszentmihalyi & Schneider, 2000; Delle Fave & Massimini, 2005) data analysis focused on some major experiential variables: challenges, skills, concentration, involved, control of the situation, alert, happy, active, wish to do the activity, and perceived long-term goals. In order to identify differences in the quality of the subjective experience between HBI,

MBI and LBI patients, aggregated z-scores were at this point calculated at the subject level and subsequently compared between groups through the ANOVA procedure.

The relationship between levels of perceived challenges and skills - on the one side - and the quality of experience - on the other side - was explored through the Experience Fluctuation Model, described in detail in Chapter 3 (EFM, Massimini et al., 1987). A Chi Square procedure was used to check for significant differences between groups in channel frequency distribution during the main daily activities.

To examine the role of autonomy level and typology of activities in influencing participants' quality of experience, a series of regression analyses were run adopting a multilevel (ML) approach. ESM data present a typically hierarchical structure, with repeated measures nested within individuals (Bryk & Raudenbush, 1992; Raudenbush & Bryk, 2002). Multi-level models were performed taking participants as random effect (Hox, 2002; Baayen, Davidson, & Bates 2008). Random effects were employed in order to account for the non-independency of observations, since rating scales were collected multiple times for each participant (32.4 self-reports per person on average). Random slopes were also tested in order to estimate the variance of the fixed effects across participants, and those which significantly improved the model's fit were included. Since random slopes remove the baseline subjects' variance on fixed effects, they allowed for a more reliable analysis of the model. The analysis of fixed effects started with a full factorial model which was progressively simplified by removing the variables/interactions for which no parameter was significant. P-values were calculated following Bates (2005). Once the models were fitted, atypical outliers were identified and removed (employing 2.5 SD of the residual errors as criterion). The models were then refitted to ensure that the results were not driven by a few overly influential outliers.

Separate analyses were run for the following variables: concentration, involved, in control, active, happy, wish doing the activity, and goals. First, we calculated the by-participant random intercept for each experiential variable, through extracting the variance of the random effects from the fixed effects, in order to enhance fixed effects reliability. We then added the predictors to the model. The type of activity (personal care, leisure, interactions and rehabilitation), and participant group (assigned on the basis of the BI total score) were included as fixed effects and their interactions were also considered.

Finally, we wanted to investigate the relationship between perceived challenges and skills, type of activity and level of autonomy. One possible strategy of testing the differences in variances of two repeated measurements (challenges/skills) can be the adoption of a bivariate three-level model.

The group-level and the type of activity-level predictors were simultaneously entered in the model specifying the multivariate structure, and challenges/skills (measure) were nested in subjects. Perceived skills and challenges were, therefore, tested in a unique bivariate model, including both scales as dependent variables. Type of activity and participant group were included as fixed effects. We entered a dummy variable which indicated the dependent measure considered in each datapoint, in particular challenges when we considered the predicted fluctuation of skills and vice-versa. All the possible interactions were tested. Beep random effects, nested within participants, were also included in this model, since each beep was associated with the two dimensions of challenges and skills.

4.5. Results: The general sample

4.5.1. Time budget

Daily activities. Table 1 shows participants' activity distribution during the sampling week. Participants prominently reported personal care (comprising eating and resting but also taking medications), followed by leisure (reading, crosswords, using the computer and watching TV) and interactions.

Table 1. Percentage distribution of patients' daily activities

Activities	%
Personal care	30
Leisure	26.2
Interactions	20.4
Rehabilitation	11.4
Others	12
N. answers	1547

Note: N. participants=50

Motor rehabilitation activities were reported in 11.4% of the answers and included physiotherapy, autonomous exercise, and kinetec – a device designed to provide a continuous passive movement for the bending and stretching of the jointed limb, according to a predicted motion circle (Beny & Griesmar, 2001). In 12% of the answers participants described other activities, which mostly comprised waiting for meals and treatments or waiting for the doctor and the physiotherapist.

Content of thoughts. Table 2 shows the percentage distribution of the content of thoughts that participants reported during the ESM week. Thoughts were prominently devoted to home chores

and activities (housework, financial transactions or bank records), and to personal care, followed by related to thinking about interactions (family members, friends or other patients), leisure activities, medical treatments (medications and pharmacological therapies) and rehabilitation tasks.

Table 2. Percentage distribution of patients' daily thoughts

Content of thoughts	%
Personal care	24.9
Leisure	13
Interactions	17.5
Medical treatments	9.8
Rehabilitation	8.6
Home chores	26.2
N. answers	1464

Note: N. participants=50

Locations. Concerning locations (Table 3), patients prominently reported being in their room, followed by recreational areas (living room) and other places (corridors and doctors' consulting room). Only in 2.8% of the ESM forms patients reported being in the rehabilitation gym: however, they also practiced exercise in other places, such as their room while doing passive physiotherapy (kinetec) and corridors while doing autonomous exercise with the physiotherapist or alone. In 3.1% of the answers participants reported to be out of the hospital, mostly at home, where patients are allowed to spend a few days toward the end of the rehabilitation period, in order to gradually re-adjust to their usual life.

Table 3. Percentage distribution of locations

Locations	%
Room	70.8
Recreational area	14.6
Rehabilitation gym	2.8
Other places in hospital	8.7
Outside hospital	3.1
N. answers	1582

Note: N. participants=50

Social contexts. Table 4 shows the distribution of social contexts reported by the patients during the sampling week. Participants prominently reported being with other patients or alone. The latter result is in line with findings obtained from the general population tested with ESM during daily

life (Larson, 1997; Delle Fave e Massimini, 2004). In 13.2% of the ESM forms participants reported being with their family, in 10.5% with friends, and in 7% with the hospital staff.

Table 4. Percentage distribution of social contexts

Social contexts	%
Family	13.2
Friends	10.5
Alone	32.2
Hospital staff	7
Other patients	37.1
N. answers	1500

Note: N. participants=50

Physical sensations. Table 5 shows the percentage distribution of the answers to the question “Did you perceive any physical sensation?”. Participants provided answers related to physical sensations as well as to psychological states, such as emotions. Since the latter involve physiological arousal, participants reported them as physical sensations. Answers provided during the daily activities and during rehabilitation tasks were separately analyzed.

Patients prominently reported positive psychological states, such as satisfaction and contentment. Osteo-muscular sensations, in particular fatigue and muscle or joint pain, and negative psychological sensations, such as worry and sadness, followed. In 23.7% of the answers participants reported general physical feelings, mainly referring to visceral pain (stomachache, headache).

During motor rehabilitation tasks the great majority of the answers was reported to osteo-muscular sensations. Positive psychological states and general physical sensations followed in equal percentages.

Table 5. Percentage distribution of the perceived physical sensations reported in daily activities and during rehabilitation tasks

Phyisical sensations	General %	Rehabilitation %
General	25.6	18.5
Osteo-muscolar	23.7	59.7
Positive psychological	37.8	18.5
Negative psychological	13	5
N. answers	785	119

Note: N. participants=50

Long term importance of the ongoing activity. In 41.2% of the ESM forms participants reported the perception of future goals. The percentage distribution of the long term importance of the ongoing activity (future goals) reported during the sampling week is shown in Table 6.

Table 6. Percentage distribution of the perceived future goals

	Future goals %
Work	3
Personal life	13.5
Social relations	11.5
Leisure	9.4
Personal care	11.9
Health	46.5
Others	4.2
N. answers	639

Note: N. participants=50

Concerning the perception of the long term importance of the ongoing activities, the great majority of answers fell in the category health. Answers related to personal life, personal care, social relations and leisure followed. Only in 3% of the answers, participants reported that the activity they were performing was relevant for their job.

The long term importance of rehabilitation activities is shown in table 7. They accounted for 7.8% of the ESM forms.

Table 7. Percentage distribution of the perceived short and long term goals reported during rehabilitation activities

	Future goals during rehabilitation %
Work	-
Personal life	1.7
Social relations	-
Leisure	0.8
Personal care	0.8
Health	90.8
Others	5.8
N. answers	120

Note: N. participants=50

During rehabilitation activities participants reported health as the main category of answer related to the perception of future goals. The remaining 10% of the answers referring to the

perception of future goals was related to the category others (outstanding projects or housework) personal life, leisure and personal care.

4.5.2. Average experience during daily activities

We subsequently focused on the average experience associated with each daily activity taking into account – as previously explained – core cognitive, emotional and motivational dimensions: challenges, skills, concentration, involved, in control, alert, happy, active, wish to do the activity, at stake and goals.

The scaled variables were standardized at the beep-level: A mean value for each variable was calculated for each participant and a global mean score was subsequently calculated for each activity (Table 8). *T* tests were performed to identified scores that were different from the mean (corresponding to zero). Beside the average values, the level of statistical significance is reported. The further the value of a variable is from zero, the more the *t* statistic assume higher value and the level of significance increases. This implies that the value assumed by the examined variable cannot be attributed to casualty, rather it characterized a specific situation and therefore it is not passive of an illusory interpretation.

Table 8. Average experience during daily activities

Activities	Personal care		Leisure		Interactions		Rehabilitation	
	M	SD	M	SD	M	SD	M	SD
Challenges	-0.28***	.91	-0.11*	.92	0.15**	.96	0.80***	.94
Skills	-0.07	1.01	0.02	1	0.06	1.02	0.19**	.82
Concentration	-0.33***	1.07	-0.01	.89	0.23***	.82	0.49***	.94
Involved	-0.28***	1.02	-0.06	.92	0.29***	.86	0.44***	.9
In control	-0.17***	1.06	0.03	.92	0.14*	.97	0.23***	.86
Happy	-0.11*	.98	-0.03	.89	0.23***	1.11	-0.08	1.05
Active	-0.11*	1.04	-0.14**	.94	0.15***	.8	0.38***	.98
Wish to do the act.	-0.11**	.85	0.12*	.99	-0.02	1.06	-0.12	.83
Goals	-0.11*	.85	-0.28***	.85	-0.02	.96	0.92***	1.06
N. answers	461		407		317		176	

N. participants=50

*=*p*<.05

**=*p*<.01

***=*p*<.001

During personal care participants perceived significantly below average values of challenges (*t*=-6.68), concentration (*t*=-6.67), involved (*t*=-5.73) and in control (*t*=-3.42). Concerning the motivational and emotional aspects, they perceived significantly low levels of wish to do the

activity ($t=-2.67$) and long term goals ($t=-2.48$), as well as significantly low values of happy ($t=-2.47$) and active ($t=-2.36$).

During leisure, participants perceived significantly below average values of challenges ($t=-2.33$), active ($t=-3$) and long term goals ($t=-6.34$), whereas above average values of wish to do the activity ($t=2.37$).

During interactions patients reported significantly above average values of challenges ($t=2.70$), concentration ($t=5.02$), involved ($t=5.96$), in control ($t=2.48$), happy ($t=3.59$) and active ($t=3.43$).

Finally, while performing motor rehabilitation tasks, patients reported significantly above average values of challenges ($t=11.32$), skills ($t=3.09$), concentration ($t=6.91$), involved ($t=6.47$), in control ($t=3.51$), active ($t=5.12$) and goals ($t=10.78$).

4.5.3. Experience Fluctuation in the EFM channels and perceived experience

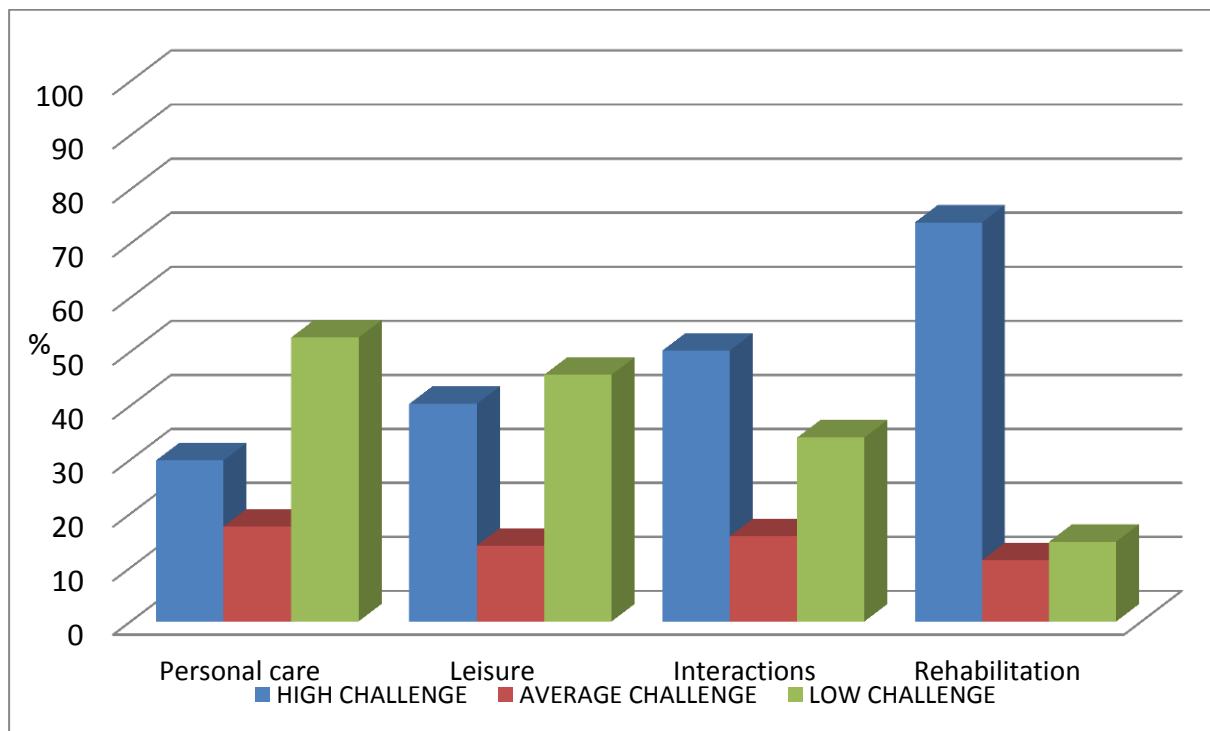
Before data analysis, EFM channels were grouped into three categories: a) “high challenge”, comprised channels 1, 2 and 8 (arousal, optimal experience and anxiety), characterized by challenges higher than subjective mean; b) “average challenge”, comprised channels 3 and 7 (control and worry), characterized by average challenges values; c) “low challenge”, comprised channels 4, 5 and 6 (relaxation, boredom and apathy), characterized by challenges lower than subjective mean. Figure 3 shows the frequency distribution of daily activities in the high, low and average challenge channels of the EFM.

During personal care, patients reported the perception of low challenges in over half of the self-reports (52.6% of the answers), in particular associating these activities with boredom (23.6%), followed by apathy (17.8%) and relaxation (11.2%). Answers related with the perception of challenges higher than the subjective mean accounted for 29.8% of the answers; in particular in 11.6% of the answers participants reported optimal experience, in 10.3% anxiety and in 8% arousal. Participants reported average challenges in 17.6% of the self-reports, in particular worry in 10.3% of the answers and control in 7.3%.

During leisure patients' forms were more homogeneously distributed between low challenges (45.7% of the self-reports) and high challenges (40.3%). Among the low challenge channels apathy was reported in 18.9% of the answers, boredom in 16.7% and relaxation in 10.1%. Among the high challenge channels, patients reported arousal, optimal experience and anxiety in the same percentage (13.8% of the self-reports). Participants associated leisure with average challenges in 14% of the self-reports, reporting control in 9.3% of the self-reports and worry in 4.7%.

Interactions were associated with the perception of challenges higher than the subjective mean in 50.2% of the self-reports, with optimal experience accounting for 22.4%, arousal for 18.3% and anxiety for 9.5% of the total answers. The perception of low challenges was reported in 34.1% of the self-reports, referring to apathy in 17.4% of the self-reports, boredom in 11.4% and relaxation in 5.4%. Participants associated interaction with average challenges in 15.8% of the answers, reporting control in 9.5% of the answers and worry in 6.3%.

Figure 3. Daily activity distribution across the three EFM channel categories



N. participants=50; N. total answers=1366

As for motor rehabilitation activities, the vast majority of participants' answers fell into the high challenge category (73.9% of the self-reports), prominently referring to arousal (35.2%) followed by optimal experience (25%) and anxiety (13.7%). The perception of low challenges accounted only for 14.8% of the ESM forms. In particular participants reported apathy in 5.7% of the answers, and both relaxation and boredom (4.6%). Average challenges were perceived in 15.8% of the answers, with control accounting for 7.4% of the self-reports and worry for 4%.

4.6. Results: Daily experience and autonomy

Participants were then divided into three groups, based on their level of autonomy in the ADL (Shah et al., 1998). As previously described, the first group (“HBI”=high BI) comprised 15 patients with a BI total score between 91/100 and 100/100. The second group (“MBI”=moderate BI) comprised 24 patients with a BI total score ranging between 61/100 and 90/100. The third group (“LBI”=low BI) comprised 11 patients with a total score between 21/100 and 60/100.

4.6.2. Time budget

Daily activities. Table 9 shows the daily activity categories reported during the sampling week by the three groups of participants. HBI and MBI patients were prominently involved in personal care, followed by leisure, interactions and motor rehabilitation activities. Other activities mostly comprised waiting for meals and treatments or waiting for the doctor and the physiotherapist. As for LBI patients, they prominently reported doing leisure, followed by personal care, interactions and motor rehabilitation activities. Other activities were reported in 10.5% of the total answers. No significant group differences were detected in the activity percentage distribution.

Table 9. Percentage distribution of daily activities in the three groups of participants

Activities	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
Leisure	27.2	24.4	29.1
Interactions	18.5	21.2	21.3
Personal care	30	30.7	27.8
Rehabilitation	12.6	10.7	11.3
Other	11.7	13	10.5
N answers	437	739	371

Note: N= No. of participants

Content of thoughts. Table 10 shows the percentage distribution of the contents of thoughts reported by the three groups of participants during the sampling week.

HBI, MBI and LBI patients prominently reported thinking about personal care activities and their home chores and situations.

A Chi square analysis showed a significant group difference in the thoughts distribution ($\chi^2=25.20$, $p<.01$): More specifically, the evaluation of cell Chi square values highlighted that HBI patients referred thinking about medical treatments significantly more frequently than MBI and LBI patients.

Table 10. Percentage distribution of content of thoughts in the three groups of participants

Content of thoughts	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
Personal care	24.3	24.1	27.4
Leisure	12.5	12.1	15.3
Relationships	15	18.8	17.8
Medical treatments	14.5	9.6	9.6
Rehabilitation	9.6	8.8	7.1
Home	24.3	29.1	22.9
N. answers	408	702	354

Note: N= No. of participants

Locations. Concerning locations (Table 11), all groups prominently reported being in their room, followed by recreational areas and other places (corridors and doctors' consulting room). Being in the rehabilitation gym accounted for a low percentage of the ESM forms; however, as previously explained, patients further practiced motor rehabilitation exercises autonomously, in their room while doing passive physiotherapy (kinetec) and in corridors with the physiotherapist or alone.

Table 11. Percentage distribution of locations in the three groups of participants

Locations	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
Room	72.7	63.4	77
Recreational areas	14.9	17.2	7.4
Gym	2.9	3.3	1.3
Other hospital	6.4	9.1	9.8
Extra-hospital	2.2	4.7	0.5
Total answers	447	771	364

Note: N= No. of participants

A Chi square analysis showed a significant group difference in the location distribution ($\chi^2=57.19$, $p<.001$): More specifically, the evaluation of cell Chi square values highlighted that LBI patients referred being in their room significantly more frequently than MBI and HBI patients and in recreational areas significantly less frequently than the other two groups.

Social context. In Table 12 the social context distribution across groups is reported. HBI and MBI participants showed similar answer patterns, prominently reporting to be with other patients and alone, followed by being with family and with the hospital staff. LBI patients prominently reported being alone, followed by being with other patients, with family members, with friends and with the hospital staff.

A significant group difference was detected in the social context distribution ($\chi^2=65.73$ $p<.001$): LBI patients reported being alone significantly more frequently and being with other patients significantly less frequently than participants in the other groups.

Table 12. Percentage distribution of the social contexts in the three groups of participants

Social contexts	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
Family	12	14.6	12
Friends	9.5	11	11
Hospital staff	9.7	4.8	7.8
Other patients	38.5	43.2	23.8
Alone	30.3	26.3	45.5
Total answers	423	703	374

Note: N= No. of participants

Perceived physical sensations. Regarding physical sensations perceived during daily life (Table 13), HBI patients prominently reported osteo-muscular sensations, followed by positive psychological states and general both sensations. Only in 6.4% of the answers participants reported negative psychological states. MBI patients mainly reported positive psychological states, followed by osteo-muscular and general sensations, and negative psychological states. LBI patients mainly reported negative psychological states, followed by osteo-muscular and general physical sensations. This group reported positive psychological states only in 5.6% of the answers.

Table 13. Percentage distribution of the physical sensations in the daily life in the three groups of participants

Physical sensations	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
General	22.3	23	27.5
Osteo-muscular	38.6	24.5	26.9
Positive psychological	32.6	33.7	5.6
Negative psychological	6.4	18.9	40
Total answers	233	392	160

Note: N= No. of participants

A significant group difference was detected in the answers distribution ($\chi^2=39.02$ $p<.001$): Compared with the other two groups, HBI patients reported the perception of osteo-muscular

sensations significantly more frequently, while LBI patients reported positive psychological states significantly less frequently and negative psychological states significantly more frequently.

During the rehabilitation tasks (Table 14), the great majority of the answers in all groups fell into the category osteo-muscular sensations. No significant group difference was detected in the answers distribution among the three groups of participants.

Table 14. Percentage distribution of physical sensations in the three groups of participants during rehabilitation activities

Physical sensations in rehabilitation	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
General	17.5	9.8	28.6
Osteo-muscular	60	60.8	57.1
Positive psychological	20	5.9	7.1
Negative psychological	2.5	23.5	7.1
Total answers	40	51	28

Note: N= No. of participants

Long term importance of the activity. Table 15 shows the percentage distribution of the future goals perceived by the three groups during the sampling week. All prominently reported health. However, while for HBI patients the category health accounted for almost 70% of the total answers, for MBI and LBI patients it accounted for less than half of the self-reports.

Table 15. Percentage distribution of perceived future goals in the three group of participants

Future goals	HBI (N=15) %	MBI (N=24) %	LBI (N=11) %
Work	1.9	3.8	2.3
Personal life	7.9	13.2	21.2
Social relations	4.2	16.1	9.1
Leisure	3.6	8.8	18.2
Personal care	7.3	14	12.1
Health	68.5	40.4	34.9
Others	6.7	3.8	2.3
N answers	165	342	132

Note: N= No. of participants

A significant group difference was detected in the distribution of the answers related to the perception of future goals ($\chi^2=74.41$ $p<.001$): considering the cell Chi square values, HBI patients

reported health, MBI patients reported social relations and LBI patients reported personal life and leisure significantly more frequently than the other groups.

4.6.2. Average experience during daily activities

We subsequently focused on the quality of experience that the three groups of participants associated with daily activities.

As shown in Table 16, HBI patients associated personal care activities with significantly below average values of challenges ($t=-3.83$), concentration ($t=-3.23$) and active ($t=-2.34$). During leisure they perceived significantly low values of wish to do the activity ($t=-2.43$) and goals ($t=-5.07$). During interactions, only concentration scored significantly above average ($t=2.45$). Finally, during rehabilitation activities they perceived significantly high scores for challenges and skills ($t=12.79$ and $t=3.78$ respectively) as well as concentration ($t=6.8$), involvement ($t=5.3$), control of the situation ($t=4.04$), active ($t=6.25$), and goals ($t=7.71$).

Table 16. Average experience during daily activities among HBI patients

	Personal care N=15		Leisure N=15		Interactions N=15		Rehabilitation N=15	
	M	DS	M	DS	M	DS	M	DS
Challenges	-0.29***	.88	-0.13	.84	0.01	1	1.09***	.63
Skills	-0.07	.98	0.03	.98	-0.01	1.14	0.34***	.67
Concentration	-0.28**	1.01	-0.03	.84	0.25*	.9	0.71***	.78
Involved	-0.25	.98	-0.07	.83	0.19	.86	0.71***	.99
In control	-0.19	1.07	-0.03	.99	0.15	.85	0.47***	.85
Happy	-0.02	.96	-0.13	.94	0.2	1.14	0.01	.99
Active	-0.21*	1.01	-0.10	.89	0.02	.83	0.78***	.91
Wish to do the act.	0.12	.76	-0.23*	.99	0.08	1.21	0.05	.8
Goals	-0.09	.81	-0.37***	.74	-0.17	.86	1.11***	1.02
N. answers	131		119		81		55	

*=p< 0.05 **=p< 0.01 ***=p< 0.001 N = number of participants

MBI participants (Table 17) associated personal care with significantly below average challenges ($t=-4.84$), concentration ($t=-4.77$), involvement ($t=-4.02$), and control ($t=-2.59$). During leisure they perceived significantly low values of active ($t=-3.27$) and goals ($t=-4.19$). During interactions, on the contrary, they reported significantly high values of challenges ($t=3.48$), concentration ($t=2.97$), involved ($t=5.15$), and happy ($t=2.21$). Rehabilitation tasks were characterized by significantly high values of challenges ($t=4.6$), concentration ($t=3.85$), involved ($t=3.35$) and goals ($t=5.41$).

Table 17. Average experience during daily activities among MBI patients

	Personal care N=24		Leisure N=24		Interactions N=24		Rehabilitation N=24	
	M	DS	M	DS	M	DS	M	DS
Challenges	-0.29***	.89	-0.07	1	0.26***	.94	0.52***	1.01
Skills	-0.11	.99	0.08	.99	0.05	.98	0.16	.91
Concentration	-0.34***	1.07	-0.01	.92	0.21**	.87	0.42***	.97
Involved	-0.27***	1	-0.06	.95	0.36***	.86	0.31**	.8
In control	-0.18*	1.06	0.09	.89	0.14	.94	0.12	.84
Happy	-0.13	1.03	-0.01	.83	0.21*	1.17	-0.04	.9
Active	-0.0	1.02	-0.23**	.94	0.25	.83	0.02	.89
Wish to do the act.	-0.09	.91	0.11	1	0.08	.97	0.13	.9
Goals	-0.11	.86	-0.29***	.90	0.10	1.03	0.68***	1
N. answers	227		180		157		79	

*=p< 0.05 **=p< 0.01 ***=p< 0.001 N = number of participants

LBI patients (Table 18) associated personal care with significantly low challenges ($t=-2.99$), concentration ($t=-3.72$), involvement ($t=-3.2$), happy ($t=-2.17$), and active ($t=-2.24$). During leisure all the variable values fluctuated around average, while interactions were characterized by significantly high levels of concentration ($t=3.9$), involved ($t=2.74$), and happy ($t=2.6$). Finally, during rehabilitation activities they perceived significantly high values of challenges ($t=6.08$), concentration ($t=2.06$), involvement ($t=2.46$) active ($t=3.58$) and goals ($t=5.87$).

Table 18. Average experience during daily activities among LBI patients

	Personal care N=11		Leisure N=11		Interactions N=11		Rehabilitation N=11	
	M	DS	M	DS	M	DS	M	DS
Challenges	-0.28**	.95	-0.14	.88	0.05	.93	0.94***	1.01
Skills	0	1.08	-0.10	1.03	0.16	.97	0.05	.79
Concentration	-0.43***	1.18	0.03	.91	0.26***	.60	0.34*	1.06
Involved	-0.35**	1.12	-0.05	.94	0.27**	.87	0.34*	.88
In control	-0.14	1.08	-0.01	.89	0.11	1.14	0.11	.86
Happy	-0.2*	.93	0.06	.90	0.28*	.97	-0.25	1.34
Active	-0.24**	1.10	-0.03	.98	0.10	.70	0.56***	.99
Wish to do the act.	-0.1	.83	-0.03	.95	-0.04	1.07	0.13	.77
Goals	-0.15	.89	-0.17	.86	-0.14	.85	1.07***	1.14
N. answers	103		108		79		42	

*=p< 0.05 **=p< 0.01 ***=p< 0.001 N = number of participants

4.6.3. Differences in the average experience across groups

In order to compare the average experience associated with the four main daily activities among the three groups of participants, at this point the subject level approach was adopted in the treatment of scaled variables. After standardization, for each variable mean values were aggregated for each participant (mean z-scores): therefore, in the calculation of the mean score, N is no longer the number of self-reports but the number of participants.

The analysis of variance allowed for the comparison of the amount of variation between the three groups with the amount of variation between the group mean. Through the ANOVA procedure, some differences in the average experience were detected among the three groups during rehabilitation: In particular, MBI patients reported significantly lower values for involved and challenges than HBI patients ($F=5.26$ $p<.01$ and $F=3.89$ $p<.03$, respectively), while the latter reported significantly higher values of the variable skill and involved than LBI patients ($F= 4.48$ $p<.02$ and $F= 3.54$, $p<.04$). Table 19 shows the quality of experience that the three groups of participants associated with rehabilitation activities.

Table 19. Average experience during rehabilitation activities

	HBI N=15		MBI N=24		LBI N=11	
	M	DS	M	DS	M	DS
Challenges	1.17***	.45	.53**	.73	.67*	.93
Skills	.39**	.48	.18	.60	-0.28	.66
Concentration	.77***	.56	.53***	.57	.44	.70
Involved	.76***	.63	.41**	.51	.15	.68
In control	.42**	.43	0.09	.74	-0.05	.66
Happy	.11	.47	-0.12	.68	-0.66	1.88
Active	.84***	.70	.08	.69	.39	.72
Wish to do the act.	.16	.54	.18	.57	.11	.48
Goals	1.12***	.97	.60*	1	.90*	.97

*= $p< 0.05$ **= $p< 0.01$ ***= $p< 0.001$ N = number of participants

4.6.4. Perceived challenges in daily activities across groups

Using the same strategy adopted for the global sample, the ESM forms referring to channels of the EFM provided by HBI, MBI and LBI participants, were grouped into three categories: a) “high challenge” (arousal, optimal experience and anxiety); b) “low challenge” (relaxation, boredom and apathy); c) average challenges (control and worry). Since the latter category accounted for less than 20% of the forms filled out by each BI group, for sake of synthesis and clarity of interpretation,

only the percentage distribution of the answers related to high and low challenge channels will be reported. Figure 4 shows the percentage distribution of daily activities across the two channel category for each group of participants.

Personal care was associated with low challenges in over half of the self-reports across groups; In particular, boredom was reported in 27.5%, in 23.4% and in 18.5% of the forms by HBI, MBI and LBI patients respectively. A limited percentage of forms referred to high challenges, in particular optimal experience, ranging from 10% among HBI patients to 14.9% among LBI ones.

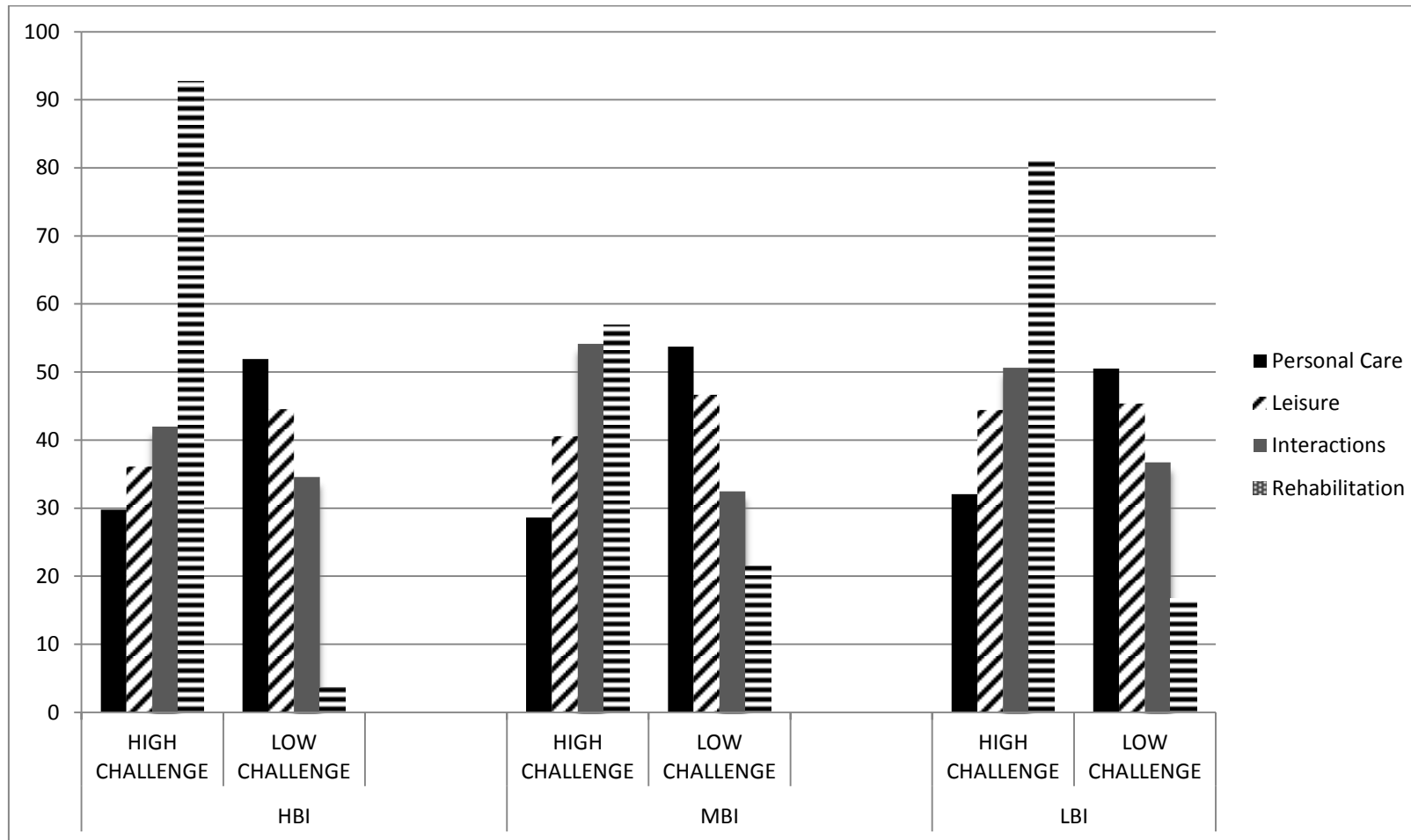
Leisure was homogeneously distributed between high and low challenge conditions across groups. In particular, optimal experience accounted for 18.3% of HBI patients' answers, 12.5% of MBI patients and 9.7% of LBI patients' ones. On the other hand, apathy was reported in 20% of the answers by all groups of participants.

Interactions were prominently associated with high challenges; in particular, optimal experience was reported in 15.6%, 27.4% and 19% of the forms among HBI, MBI and LBI participants respectively. Low challenges were perceived in one third of the self-reports on average. In particular apathy accounted for 14.8% of the forms among HBI patients, for 17.8% among MBI and for 18.9% LBI ones.

Rehabilitation activities were prominently associated with high challenges, pervasively by HBI and LBI patients (92.5% and 86.9% of the self-reports respectively), and to a lesser extent by MBI participants (56.5%). A closer analysis of the specific experiences reported within the high challenge channel categories during rehabilitation highlighted that arousal (channel 1) was prominent among HBI and LBI patients (56.6% and 39.5% of the forms respectively), followed by optimal experience (Channel 2, 28.3% and 23.7%), while MBI participants reported optimal experience in 23.6% of the forms and arousal in 16.2%. The percentage of forms referring to anxiety (channel 8) decreased with the increase in autonomy levels: 23.7% of the forms among LBI participants, 11.2% among MBI and 7.6% among HBI patients.

A significant group difference was detected in the distribution of the self-reports across channel categories during rehabilitation tasks ($\chi^2=26.18$ $p<.001$). In particular, HBI patients perceived low challenges in a significant lower percentage of the forms than the other groups, while MBI patients perceived high challenges significantly less frequently than the other participants. Moreover, a significant group difference in the distribution of the self-reports across the three high challenge channels was detected ($\chi^2=43.29$ $p<.001$): in particular, HBI patients reported arousal significantly more frequently and anxiety significantly less frequently than the other groups, while LBI patients reported anxiety significantly more often than the other participants.

Figure 4. Daily activity distribution across the EFM channels grouped according to perceived high and low challenges



HBI participants = 15 N. answers = 386
 MBI participants = 24 N. answers = 643
 LBI participants = 11 N. answers = 332

4.6.5. Multi-level model

4.6.5.1. Predictors of participants' quality of experience

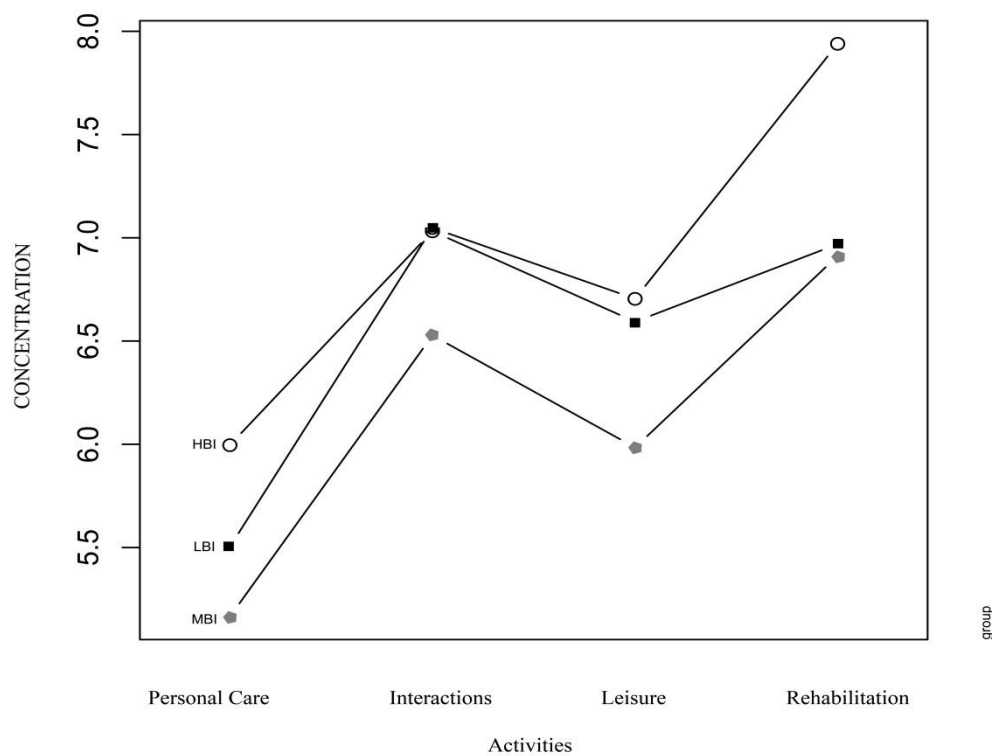
A multi-level (ML) analysis was performed in order to investigate changes in the quality of experience related to patients' type of activity and level of autonomy. ML models were performed taking participants as random effect (Hox, 2002; Baayen, Davidson, & Bates 2008). Random effects were employed in order to account for the non-independency of observations. Random slopes allowed for a more reliable analysis of the explained fixed effects, and those which significantly improved the model's fit were included.

Separate analyses were run for the 7 main experiential variables identifying the core cognitive, emotional and motivational dimensions of the experience: concentration, involved, in control, active, happy, wish to do the activity and goals. First, we calculated the by-participant random intercept for each experiential variable, by extracting the variance of the random effects from the fixed effects. The random intercept shows how random effects are related to each other, explaining how participants' rating of the variable taken into account differ from their baseline. For each experiential variables, participants' group (HBI, MBI and LBI) and type of activity (personal care, leisure, interactions and rehabilitation) were included as fixed effects and their interactions were also considered. As hypothesized, the variables type of activity and autonomy group had a significant relationship with all experiential dependent variables.

Concentration. We observed a by-participant random intercept ($SD=1.39$). Moreover, a random slope of participants on activities proved to significantly increase the goodness-of-fit of the model: less between-participant variance ($SD=.07$) was observed during interactions compared to personal care, leisure and rehabilitation ($SD=.92, SD=.67, SD=.91$ respectively).

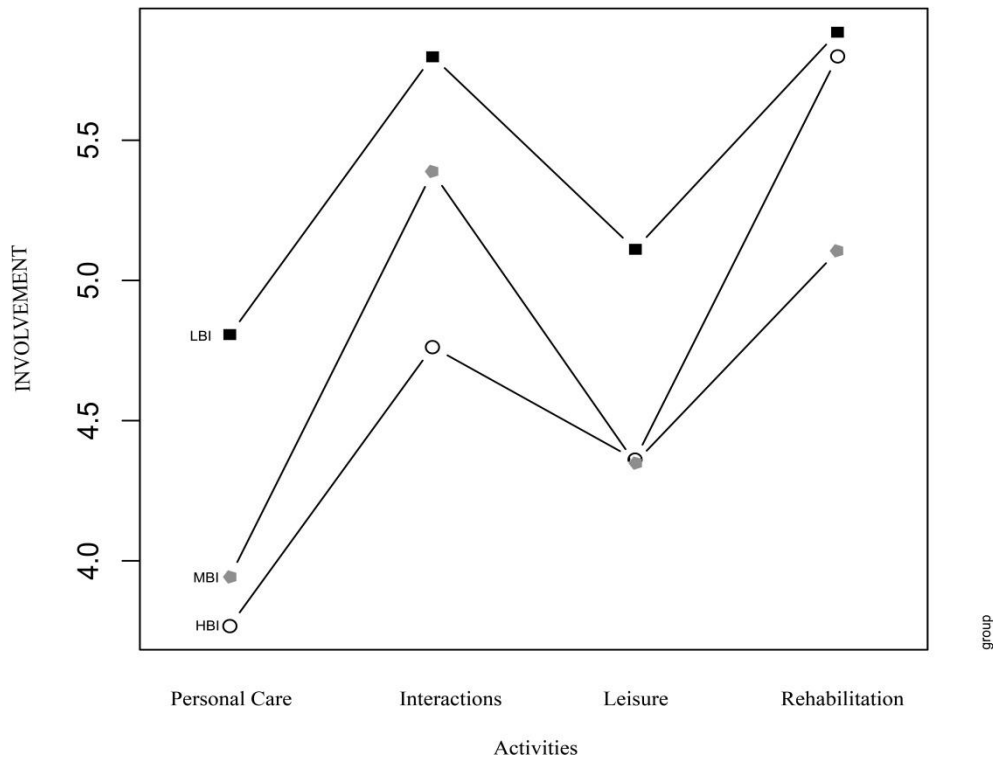
Fixed effects comprised a two-way interaction between type of activity and group (Figure 5). A similar pattern was found in all groups of patients, with higher levels of concentration observed for interactions ($t=2.44, p=.015$) and rehabilitation activities ($t=1.97, p=.049$). However, an effect of group was observed in rehabilitation activities, during which a higher concentration level was found for HBI ($t=2.27, p=.024$).

Figure 5. Predicted fluctuation of the level of concentration during the main daily activities among HBI, MBI and LBI patients



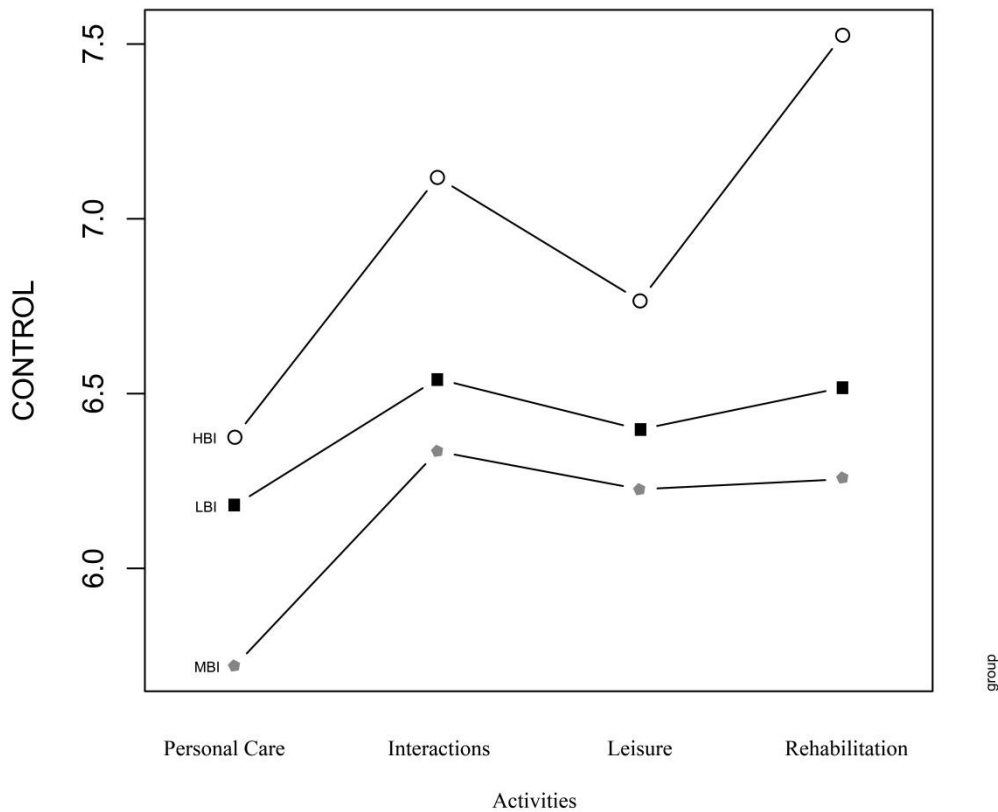
Involvement. We observed a by-participant random intercept ($SD=1.63$). Similarly to the variable concentration, fixed effects comprised a two-way interaction between type of activity and group (Figure 6). All groups showed higher levels of involvement during interactions ($t=3.08, p=.002$) and rehabilitation activities ($t=2.34, p=.019$) than during personal care. However, a modulation of group was observed in rehabilitation activities, during which HBI patients showed higher levels of involvement ($t=2.1, p=.036$).

Figure 6. Predicted fluctuation of the level of involvement during the main daily activities among HBI, MBI and LBI patients



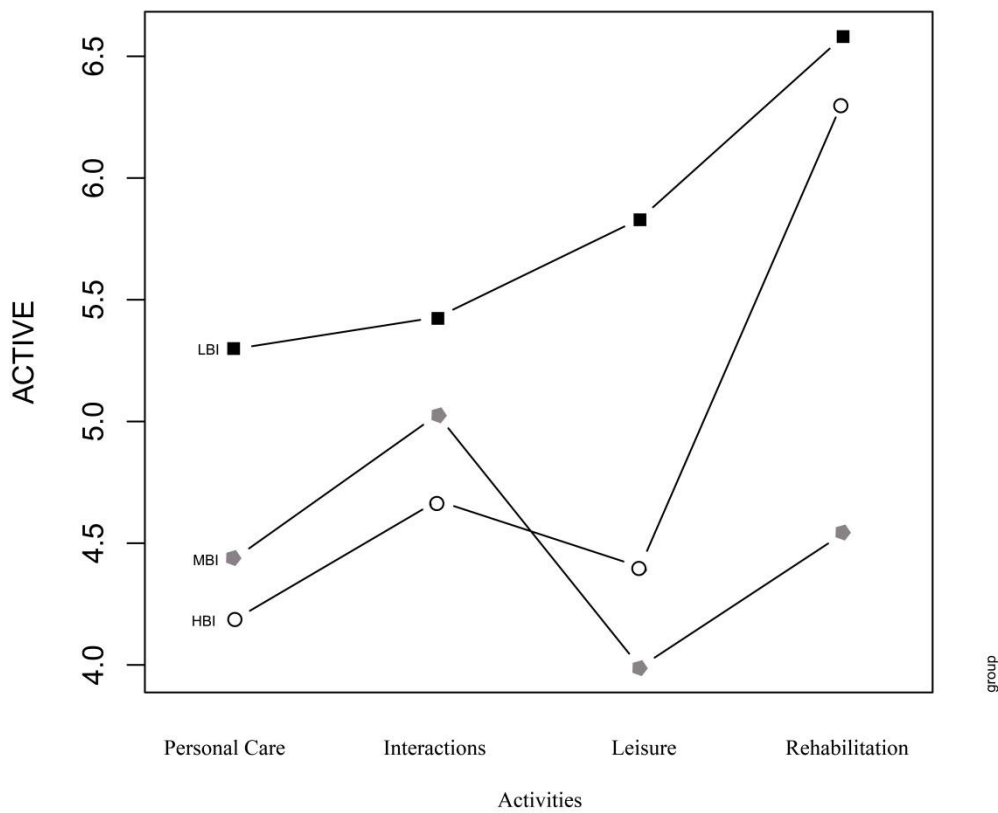
Perceived control. A by participant random intercept was observed in the analysis run on the variable (SD=2.04). As Figure 7 shows, fixed effects comprised a two-way interaction between type of activity and group. A modulation of group was observed in rehabilitation activities: HBI patients showed a tendency to perceive higher levels of control than the other participants ($t=1.87, p=.062$).

Figure 7. Predicted fluctuation of the level of perceived control during the main daily activities among HBI, MBI and LBI patients



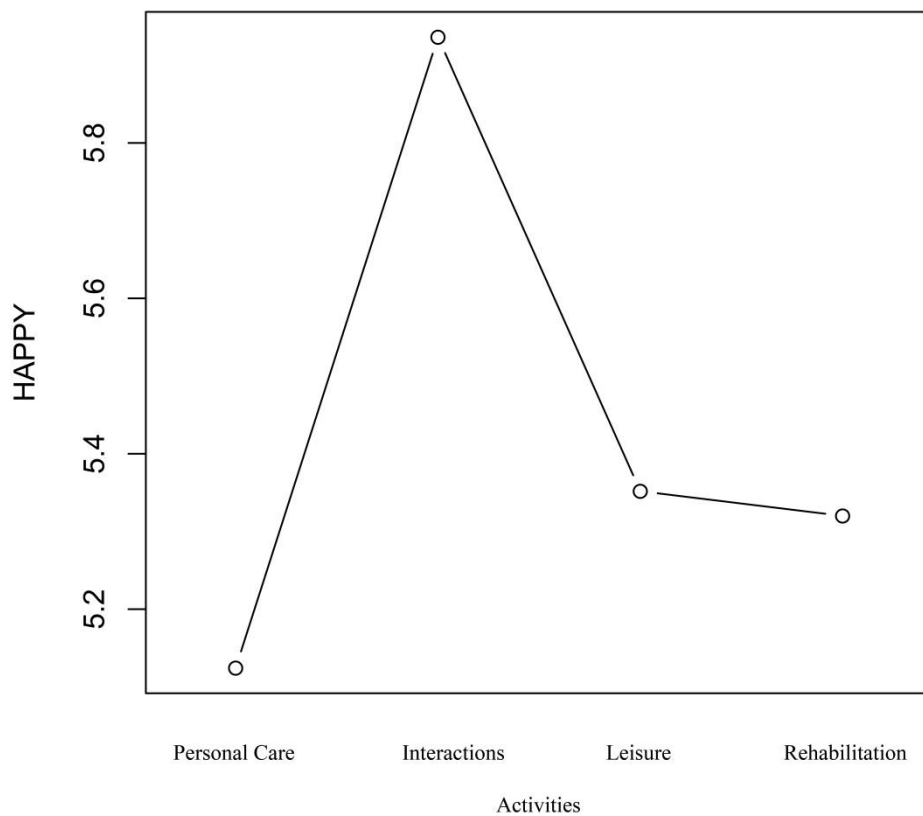
Active. A by-participant random intercept ($SD=1.47$) was observed. As shown in Figure 8, fixed effects comprised a two-way interaction between type of activity and group. Rehabilitation activities elicited higher levels of activation ($t=2.75, p=.005$). However, a modulation of group was observed in leisure and rehabilitation, during which MBI patients reported lower levels of activation ($t=-2.31, p=.02$ and $t=-2.07, p=.04$ respectively) than the other groups.

Figure 8. Predicted fluctuation of the level of the variable active during the main daily activities among HBI, MBI and LBI patients



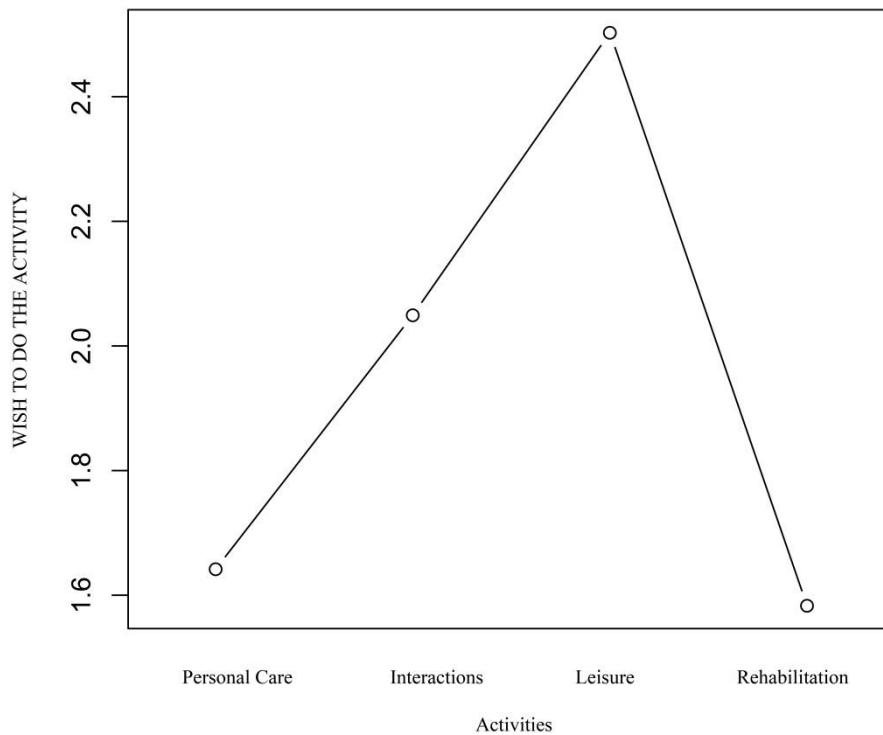
Happy. Figure 9 predicted fluctuation of the level of the variable active during the main daily activities among HBI, MBI and LBI patients. We observed a by-participant random intercept (SD=1.63). No significant fixed effects among groups were observed for the variable taken into account. However, a significant fixed effect of the type of activity indicated higher levels of happiness during interactions among all groups ($t=4.78$, $p=.001$).

Figure 9. Predicted fluctuation of the level of perceived happiness during the main daily activities



Wish doing the activity. We observed a by-participant random intercept ($SD=1.39$). No significant fixed effects were detected for groups. However, significant fixed effects were observed for the type of activity (Figure 10), with all groups reporting higher levels of wish to do the activity during leisure ($t=3.13, p=.001$).

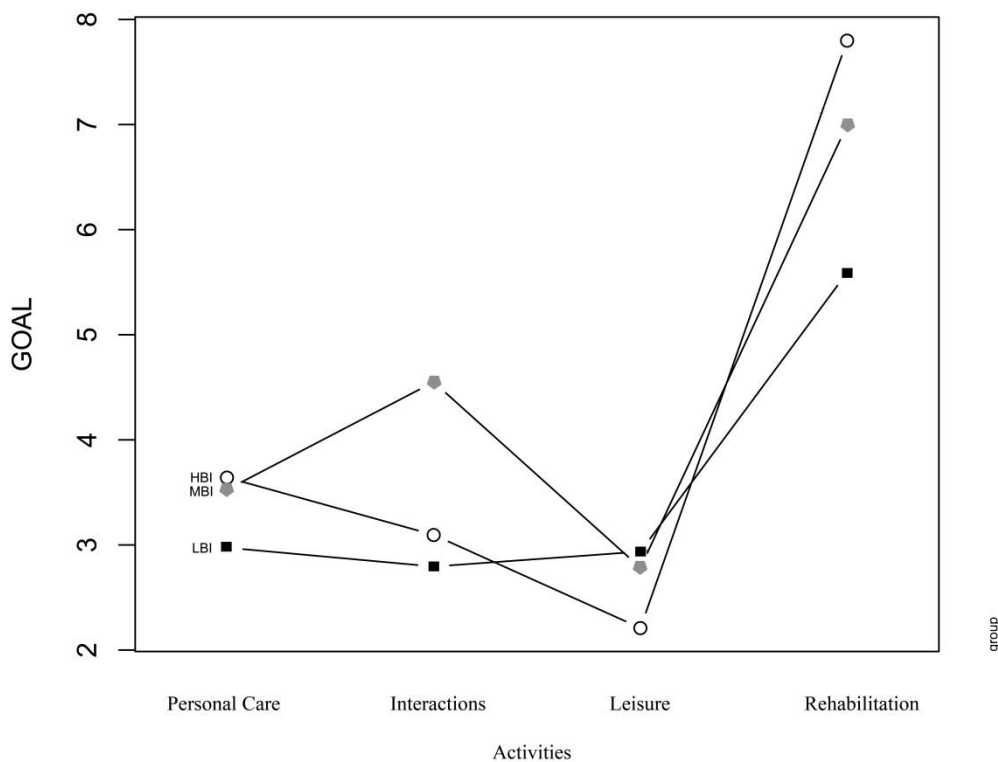
Figure 10. Predicted fluctuation of the level of wish to do the activity across HBI, MBI and LBI patients



Long term importance of the activity. We observed a by-participant random intercept ($SD=.001$). A random slope proved to significantly increase the goodness-of-fit of the model: less between-participant variance ($SD=2.14$) was observed during leisure activities than during personal care, interactions and rehabilitation ($SD=2.38, SD=2.41, SD=2.33$ respectively).

Fixed effects comprised a two-way interaction between type of activity and group, as shown in Figure 11. A modulation of group was observed in leisure activities, during which a lower perception of future goals was found for HBI participants ($t=-2.04, p=.001$).

Figure 11. Predicted fluctuation of the level of perceived long term importance of the activity during the main daily activities among HBI, MBI and LBI patients



4.6.5.2. Bivariate model

In order to detect the relationship between the fluctuation of challenges and skills, type of activity and level of autonomy, we adopted a bivariate model. The group-level and the type of activity-level predictors were simultaneously entered in the model specifying the multivariate structure, and challenges/skills (measure) were nested in subjects.

Perceived skills and challenges were both included as dependent variables. Type of activity and participant group were included as fixed effects. We entered a dummy variable which indicated the dependent measure considered in each datapoint, in particular challenges when we considered the predicted fluctuation of skills and vice-versa. All the possible interactions were tested. Beep random effects, nested within participants, were also included in this model, since each beep was associated with two dimensions.

We observed a by-participant random intercept ($SD=1.07$). The by-beep random intercept was not found to significantly improve the model's fit. However, a random slope of participants on activities proved to significantly increase the goodness-of-fit of the model: more between-participant variance was observed during interactions ($SD=1.18$) and rehabilitation ($SD=1$), in comparison with personal care and leisure ($SD=.79$, $SD=.80$ respectively).

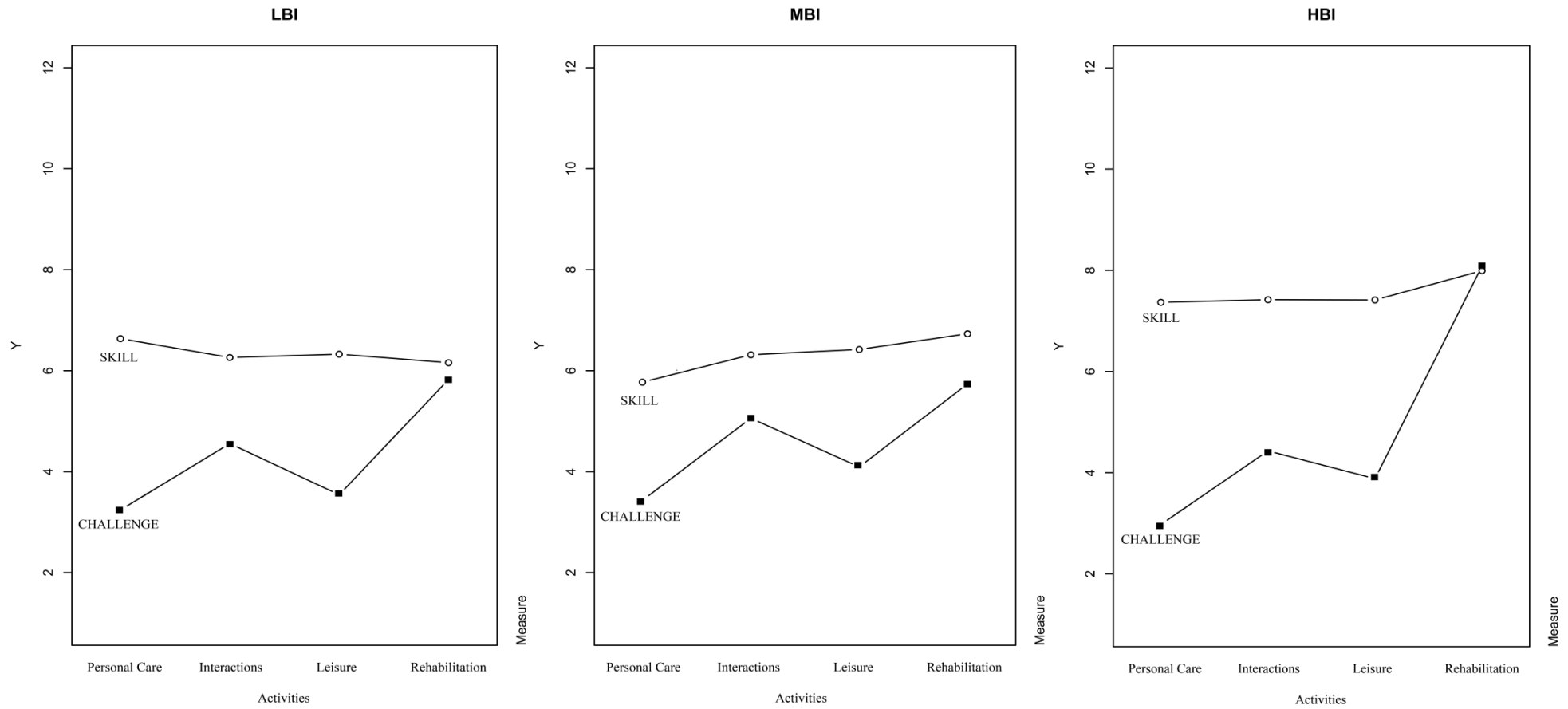
Fixed effects also comprised a three-way interaction between type of activity, measure and group. For clarity of exposure and interpretation, multi-level analyses were run for each group separately (Figure 12).

Regarding LBI patients, no significant fixed effects of skills were observed across the type of activities. However, a modulation of measure was observed among this group of patients, who reported higher levels of challenges during interactions and rehabilitation activities ($t=3.85$, $p<.001$ and $t=5.45$, $p=.001$, respectively).

As for MBI patients, an interaction between perceived skills and challenges was detected. As far as the variable skills are concerned, a modulation of measure was observed in rehabilitation activities: MBI patients reported higher levels of the variable ($t=2.36$, $p=.02$) than during personal care. As for the variable challenges, compared with the fluctuation of perceived skills and with personal care activities, higher levels of the variable were observed during interactions and rehabilitation activities ($t=3.22$, $p=.001$ and $t=2.83$, $p=.001$, respectively).

Also for HBI patients an interaction between perceived skills and challenges was detected. A modulation of measure was observed in rehabilitation activities, during which HBI patients reported higher levels of skills ($t=2.15$, $p<.03$) and challenges ($t=5.93$, $p<.001$) than during personal care.

Figure 12. Predicted fluctuation of the level of perceived challenges and skills during the main daily activities among HBI, MBI and LBI patients



CHAPTER 5

DISCUSSION AND CONCLUSIONS

5.1. Discussion

This study was aimed at analyzing the quality of experience associated with daily activities among patients hospitalized in a Rehabilitation Unit. To our knowledge, this is the first study investigating daily hospital experience from a comparative perspective, gathering data from patients with different levels of physical autonomy. Moreover, the experience associated with the daily activities during hospitalization had never been assessed before through an on-line sampling procedure.

5.1.1. The general sample

In order to provide a general overview of the daily hospital life and the quality of experience associated with the daily activities, data were first analyzed globally for the whole sample.

The analysis of the time-budget showed that participants prominently reported being involved in personal care, passive leisure and interactions. Only one tenth of their daily life was devoted to motor rehabilitation activities, such as physiotherapy, kinetec and autonomous exercise. The daily activities were mainly performed in participants' rooms, as well as in recreational areas, corridors and doctors' consulting rooms. Participants reported performing rehabilitation tasks both in the gym and in other places. In particular, they reported being in their room while doing passive physiotherapy (kinetec), and in corridors while doing autonomous exercise with the physiotherapist or alone. Participants prominently reported being with other patients and in one third of the answers alone. The latter result is in line with findings obtained from the general population tested with ESM during daily life (Larson, 1997; Delle Fave e Massimini, 2004).

Participants' thoughts prominently concerned home chores and activities, followed by personal care and relationships with family members, friends and other patients. During the main daily activities, participants reported a variety of physical sensations (visceral and osteo-muscular) and psychological states (both positive and negative), while during rehabilitation tasks they prominently reported osteo-muscular sensations (fatigue and muscle or joint pain). According to the rehabilitation guidelines and findings obtained from previous studies (McPhail, 2010; Tesio et al., 1995), a certain amount of pain and fatigue are important indicators of the effectiveness of the training.

The quality of the experience during personal care and leisure was substantially negative. During personal care participants reported low opportunities for actions, low levels of involvement, control and concentration, no desire to do the activity, low perception of long term goals. During leisure, they reported low opportunities for actions and long term goals, even though they wished to do the activity. Participants prominently associated both personal care and leisure with the perception of low challenge experiences (relaxation, boredom and apathy).

Interactions were associated with a better average experience, including high concentration, involvement, and wish doing the activity. Participants prominently associated interactions with challenges higher than the subjective mean, in particular with optimal experience and arousal.

As concerns motor rehabilitation, in spite of the short time devoted to these activities, participants associated them with significantly positive values of concentration, involvement, control of the situation and long term goals. The distribution of the forms in the EFM channels was consistent with this positive profile: participants prominently associated motor rehabilitation with arousal, optimal experience and anxiety, characterized by the perception of high challenges.

5.1.2. Daily experience and autonomy

According to their level of autonomy in the ADL, participants were first grouped in three categories: HBI, MBI and LBI. In order to analyze differences and similarities between groups in the quality of experience reported during hospitalization, the increase in the level of autonomy in relation with the length of hospitalization at the beginning of the sampling week was analyzed through a multilevel approach. The ML regression analysis allowed us to identify the relationship between the level of autonomy observed during the sampling week (BI and T2) and hospitalization length, taking into account the BI score at hospital admission and at hospital discharge.

Time-budget, comprising daily activities, content of thoughts, locations, social context, physical sensations and long term goal distribution was compared across groups.

Since the hospital is a highly structured context, the daily activity distribution was substantially similar across groups. Participants reported spending the greatest amount of their time in personal care, leisure activities and interactions which together accounted for 76,1% of the HBI patients' self-reports, 76,2% of the MBI patients' forms and 78,5% of LBI patients' ones. All groups reported spending approximately one tenth of their daily activities in motor rehabilitation tasks, such as physiotherapy, passive rehabilitation (kinetec) and autonomous exercise. From admission and throughout hospital rehabilitation all the participants attended physiotherapy and autonomous exercises on a daily basis, following an intensive treatment schedule. This kind of rehabilitation

planning allows for the gradual enhancement of functional abilities, in terms of retrieval of lost functions or development of vicarious abilities (Italian Ministry of Health, 2003). Therefore, even though rehabilitation activities apparently accounted for a limited percentage of patients' time budget, their frequencies corresponded to the maximum level of treatment intensity.

The distribution of thoughts, locations and social contexts significantly differed across groups.

HBI patients reported thinking about medical treatments significantly more frequently than MBI and LBI patients. This finding suggests that patients with a high level of autonomy, were more focused on attaining and maintaining good health, and participated more actively in the treatment plan.

Regarding locations and social contexts, low BI patients reported being in their room and alone in a significantly higher percentage of the self-reports than the other patients, as expected due to their condition of severe physical impairment and low functional autonomy. The locations where patients performed rehabilitation tasks were also related to their level of physical autonomy. While all the participants reported spending a similar percentage of their time in the rehabilitation gym, HBI and MBI patients mainly reported to further exercise in the hospital corridors, whereas LBI patients prominently attended kinetec sessions in their room.

As for the perception of physical sensations and psychological states, some differences in the answer distribution were detected across groups. According to the different rehabilitation plan, HBI patients overall reported osteo-muscular sensations significantly more frequently than MBI and LBI patients, while the latter group reported positive psychological states significantly less frequently and negative psychological states significantly more frequently than the other two groups. Instead no significant group differences were detected in the physical sensations reported during rehabilitation activities.

Concerning the perception of future goals, HBI patients reported health, MBI patients social relations, and LBI patients personal life and leisure significantly more frequently than the other groups. Consistently with their different level of autonomy, HBI patients prominently performed their activities in order to maintain the functional independence acquired and to prevent involution. On the other hand, MBI patients and LBI patients, more frequently referred as goal the adjustment to hospital daily life. MBI and LBI patients considered social relations and leisure activities as contexts in which they could share positive experiences, as well as derive social support.

We subsequently analyzed participants' quality of experience during four main daily activities: personal care, leisure, interactions and motor rehabilitation. Overall, the experience associated with

personal care and leisure was substantially negative, while the experience associated with interactions and rehabilitation was substantially positive.

During personal care participants in the three groups reported low involvement, low control and concentration, no desire to do the activity, low affect, and perceived lack of long term goals. The experience fluctuation pattern in the EFM channels confirmed the prominent association of personal care with low challenging experiences, above all boredom. Considering the large number of participants with orthopedic diseases, particularly in LBI group, results point to the importance of evaluating the perceived consequences of the physical impairment in relation with patients' prognosis. Orthopedic pathologies in most cases have a good prognosis and allow for the retrieval of high levels of autonomy in the ADL. Since most patients are aware that their physical impairment in performing personal care activities will last only temporarily, these activities are not perceived as opportunities for rehabilitation, in spite of the health professionals' recommendation to consider any ADL as an integrated part of the rehabilitation training. In the theoretical framework of Self-determination theory (SDT, Deci & Ryan, 1980), patients' motivational pattern during personal care can be defined as amotivation, a condition in which people lack in intention to behave, in sense of efficacy and control, and consequently in self-regulation. While all types of behavior regulation – be they autonomously directed or derived from external control – involve intentionality and motivation, amotivation represents the complete absence of initiative and behavioral drive.

These findings suggest that a greater emphasis on the importance of personal care activities as an integrated part of the rehabilitation training could enhance patients' motivation to perceive these routine tasks as rehabilitation exercises, whose complexity and difficulty can be graduated according to the individual conditions. This can promote the perception of higher challenges in the activity, but also concentration and control of the situation, thus fostering autonomous self-regulation. In the domain of health, personal autonomy and perceived competence predict self-management behaviors and reduce disease complications such as numbness or downfalls (Williams et al., 2011). Several studies conducted to evaluate adherence to treatment in chronic pathologies such as diabetes or HIV (Williams et al., 1998; Narayan et al., 2003; Osterberg & Blaschke, 2005), showed that autonomous self-regulation in self-management behaviors is associated with improved control of the symptoms, better quality of life, and life satisfaction. In line with these premises, personal care activities can be structured as positive and engaging opportunities through which the patients can achieve higher levels of autonomy and competence.

Despite the great amount of time devoted to leisure, regardless of their level of physical autonomy participants mostly reported to be engaged in relatively passive activities, such as watching TV and crossword puzzles, associating them with low opportunities for action and lack of long term goals, even though they perceived these activities as pleasant and desirable. Previous research findings highlighted the distinction between structured and unstructured leisure activities. This difference is likely to be responsible for the associated quality of experience (Delle Fave & Massimini, 2005; Schmidt et al., 2007). Structured leisure activities such as sports, artistic and creative tasks, are characterized by clear rules and goals, opportunities to mobilize personal skills, and to act autonomously. They are often associated with optimal experience, while the free time devoted to unstructured leisure provides short-term pleasure but also lack of meaning, disengagement and low mobilization of personal skills (Larson, 2000; Larson & Verma, 2003; Kubey & Csikszentmihalyi, 1990; Bassi & Delle Fave, 2004). In particular, watching TV is mainly associated with passiveness, low levels of concentration and involvement. The high amount of leisure time during which patients experienced low challenges should be given adequate attention. The association of non-structured leisure with low challenges, in particular with apathy, also pointed to the need of taking into account the problem of disengagement and the lack of perception of future goals (Delle Fave & Massimini, 2005). High percentages of apathy in individuals' daily life can lead to potentially pathological outcomes, as shown in clinical studies, which emphasized that the predominance of apathy hampers mental health and personal growth (Delle Fave & Massimini, 1992).

On the other hand structured leisure, such as handicrafts (for example knitting or embroidering), arts (such as painting or creative writing) and to some extent reading (according to the complexity of the reading content) are engaging tasks at a physical and/or psychological level. Individuals can find new and increasingly challenging opportunities for action in performing structured activities, and they can subsequently improve related skills. This dynamic process toward complexity is associated with an intrinsic reward (Delle Fave & Massimini, 2005). As proposed by Stebbins (2001, 2007), practicing serious leisure - the pursuing of amateur and hobbyist activities perceived as interesting and fulfilling - fosters commitment in the long run through the acquisition of skills and knowledge. Casual leisure activities, on the contrary, are immediately enjoyable and do not require specialist training. From this perspective, the cultivation of structured and serious leisure activities, individually performed or jointly practiced with other patients, can promote personal growth during hospitalization, since they provide both enjoyment and meaningful commitment. The practice of these activities can contribute to turn daily hospital life into an opportunity for building

new abilities or cultivating residual ones, as well as for attaining positive and rewarding experiences, thus representing a useful component of the rehabilitation training. Moreover, the long-term commitment emerging from the perception of complex and positive states, such as optimal experience, can promote the cultivation of individual or collective physical exercise and new hobbies in the home context after discharge from hospital.

Social interactions mainly involved other patients, and less frequently family members and the hospital staff. Although representing a limited part of participants' time budget, they were often associated with the perception of high challenges, and in particular with optimal experience across the three groups, confirming a variety of findings that highlighted the pivotal role of relationships in promoting well-being, and their positive effects on the development of social competencies and personal identity (Burlison, 2003; Ryff & Singer, 2008). However, during interactions participants also provided answers related to the perception of low challenges, in particular apathy. Being with others does not necessarily provide optimal experience *per se*. The quality of experience is primarily related to the kind of activities people perform when they are together (Delle Fave, Massimini & Bassi, 2011). Interacting with one another can be related to shared tasks and instrumental to specific goals, such as structured leisure or motor rehabilitation exercise. From this perspective, promoting structured leisure activities as well as activities performed together with physiotherapists and with other patients can foster the occurrence of positive interactions. This can elicit high concentration and involvement in the ongoing task, as well as positive emotions such as excitement, enjoyment and relaxation.

Finally, a very peculiar experiential profile characterized motor rehabilitation activities. In spite of the short time devoted to these activities, all groups associated them with significantly positive values of concentration, involvement, control of the situation and long term goals.

The distribution of the forms in the EFM channels is consistent with this positive profile: despite the perception of pain and fatigue, participants prominently associated rehabilitation practice with arousal, optimal experience and anxiety, all characterized by the perception of high challenges. Previous studies showed that optimal experience plays a crucial role in the promotion of good performances in the most diverse domains, such as sports (Jackson & Csikszentmihalyi, 1999), arts (Martin & Cutler, 2002), learning (Bassi et al., 2007; Caprara et al., 2003) and work (Csikszentmihalyi & Lefevre, 1989; Eisenberger et al., 2005). Results from our participants confirmed that the core aspect of optimal experience consists in its cognitive dimensions of concentration and engagement, rather than in the emotional components of enjoyment and pleasure. In addition, the participants in this study associated rehabilitation practice with significantly high

values of long term goals. This represents an important prerequisite for the systematic replication of physical exercise in the hospital setting and in the long term at home, giving rise to a virtuous cycle which fosters the development of progressively higher levels of autonomy through skill enhancement and the search for more complex challenges (Delle Fave & Massimini, 2005).

Some differences in the average quality of experience were detected between groups in these activities: As expected, HBI patients associated rehabilitation tasks with higher perceived skills and involvement than LBI patients. This is clearly related to their high level of autonomy. On the other hand, MBI patients perceived lower levels of challenges and involvement than HBI patients. As for MBI and LBI patients', their condition, still far from the achievement of the highest attainable physical independence, can generate lower confidence and expectations especially if the proximal outcomes of rehabilitation tasks are not immediately positive. This can negatively influence patients' commitment and sustained engagement.

The higher percentage of answers related to anxiety among LBI participants during rehabilitation tasks allows for some additional considerations. Since these patients have to cope with low levels of autonomy, pain arising during physical exercise, and psychological distress, lower levels of anxiety would facilitate concentration on the task, control of the situation and a more effective performance. This could reduce patients' reluctance to perform more challenging rehabilitation tasks and could facilitate function recovery.

Results highlighted the importance of training and preparation in coping with challenging tasks such as motor rehabilitation activities (Bassi & Delle Fave, 2010; Delle Fave et al., 2003).

5.1.3. Type of activity and level of autonomy as factors influencing the quality of experience

5.1.3.1. *Predictors of participants' quality of experience: two-way interactions analysis*

ML regression analysis allowed us to verify the relationship between level of autonomy, type of activity and the cognitive, emotional and motivational components of the experience.

In particular the level of autonomy had a modest impact on the quality of experience. Contrary to our hypothesis, similar experiential patterns were identified in all groups in the major daily activities (personal care, leisure and interactions), regardless of their level of autonomy. The analysis of the situation-contingent occasion-level predictors revealed instead the crucial relationship of the experience with type of activity.

Cognitive and affective dimensions significantly increased when participants were engaged in interactions. The level of concentration and involvement in the ongoing conversation, as well as the level of happiness significantly increased compared with the other activities in all groups. As

already highlighted, these results are in line with previous findings obtained from studies conducted among people with physical disabilities and in the general population (for a review, see Delle Fave, Massimini & Bassi, 2011).

Leisure activities predicted significantly high levels of wish doing the activity in all groups. However, the analysis of the quality of experience during both leisure and across EFM channels highlighted a rather homogeneous distribution between high and low challenge conditions. Overall, even though all participants perceived higher desirability of leisure compared with the other activities, non-structured leisure emerged as a passive relaxing activity, neither particularly positive nor meaningful. Relaxing activities can foster the retrieval of energies after engagement on demanding activities, such as motor rehabilitation trainings. Studies conducted among people with spinal cord injury and chronic illness (Iwasaki & Mannell, 2000; Hutchinson et al., 2010) highlighted that non-structured leisure could be useful to buffer effects of immediate life circumstances and to sustain coping efforts. Activities that promote relaxation and diversion foster the occurrence of positive emotions and emotion-focused coping strategies. However, in line with other studies (George, 2010; Kotter-Grühn & Smith, 2011; Prenda & Lachman, 2001), our results also highlighted that the type of leisure activities performed by the participants did not support their potential for autonomy and skill development. The cultivation of structured leisure could instead promote positive and rewarding states of consciousness. This could provide participants with virtually unlimited opportunities for skill development and personal growth, as well as for social participation.

A modulation of group was also observed: the level of perceived goals was significantly lower among HBI patients. This can be easily explained by their high level of autonomy. For these participants the role of leisure activities as relaxation opportunities after effort was not relevant. HBI patients' abilities could be more fruitfully invested in structured and engaging activities, that could be possibly cultivated also at home.

Interesting findings emerged from the analysis of motor rehabilitation activities. In line with our hypothesis, type of activity and level of autonomy represented significant predictors of the quality of experience. Cognitive dimensions of the experience significantly improved during these activities, in particular for HBI patients. Rehabilitation practice represented a significant predictor of high levels of concentration, involvement and activation in all groups. Moreover, perceived concentration, involvement and control were significantly higher in HBI than in the other groups. Results are in line with previous findings showing that high levels of perceived control, skills, and activation can foster higher self-efficacy in challenging situations. Nickens (1983) indicated the

importance of identifying psychological dimensions that might affect functional recovery and other outcomes after hip fracture. Self-efficacy measures were correlated with self-care behavior in chronic arthritis patients (Lorig et al., 1989, 1993; Holman & Lorig, 1992), and in patients with hip fractures (Fortinsky et al., 2002) and stroke (Robinson-Smith et al., 2000). Patients with more confidence in their ability to perform rehabilitation protocols (rehabilitation therapy self-efficacy) experienced better functional outcomes (Fortinsky et al., 2002).

5.1.3.2. Bivariate model: the analysis of three way interactions

Because of the crucial role of challenges and skills in contributing to the emergence of different patterns of the experience, we finally analyzed the relationship between the fluctuation of challenges and skills, type of activity and level of autonomy adopting a bivariate model. A three-way interaction was observed between type of activity, measure (challenges and skills) and group.

Contrary to our hypothesis, similar fluctuation patterns of challenges and skills were identified in all patients during personal care and leisure, regardless of their level of autonomy. However, interesting differences emerged taking into account the predicted fluctuation of challenges and skills during interactions and rehabilitation activities among the three groups.

We observed a significant increase on the levels of challenges in relation to skills during interactions among MBI and LBI patients. This might be due to the fact that since MBI patients are more likely to spend their time with other patients and out of their room, social relations can represent an opportunity for conversations and for building new relationships. On the contrary, LBI patients, due to physical pain and difficulties in movements, enjoyed less social relations as well as more difficulties in leaving their room, and therefore less frequent opportunities to perceive higher challenges in interactions than in the other daily activities. This result calls for the need to individualize rehabilitation programs to participants' abilities, in order to favor optimal experience in tasks that can promote improvements in people's interaction with their environment.

A significant increase in the levels of challenges in relation to skills was also observed during rehabilitation in all groups. On the other hand, when we took into account perceived skills significant increases of the variable were observed during rehabilitation among MBI and HBI patients, by virtue of the fact that these patients were more independent and autonomous. Moreover, due to the low level of independence of LBI patients in performing all daily activities and their mobility difficulties, their levels of skills did not significantly increase during rehabilitation.

These findings support our initial expectation that motor rehabilitation activities could represent prominent opportunities for optimal experience among the activities performed during

hospitalization. Participants perceived rehabilitation tasks as meaningful challenges in which to invest their personal resources and skills, and as relevant for their long-term goals.

A better interpretation of these findings derives from well-being research. In this field, the two theoretical perspectives of hedonia and eudaimonism share the common interest of studying what promotes a good life (Ryan & Deci, 2001). The hedonic view equates happiness with positive emotions and satisfaction with life, whereas the eudaimonic view equates happiness with the human ability to pursue complex goals which are meaningful to the individual and society (for a review see Delle Fave et al., 2011). Rehabilitation tasks are not expected to provide hedonic wellbeing, in terms of enjoyment and positive affect; rather they can promote eudaimonic well-being through a process of continuous empowerment of individual abilities and competencies.

Overall, making patients more aware of their potentials and of the level of autonomy they can and do achieve during the rehabilitation sessions can promote the perception of physical and psychological well-being. In line with the concept of person-centered rehabilitation, this can also allow for patients' higher commitment to future goals. Moreover, helping patients derive gratification from physical exercise can promote a better adherence to treatments and therefore a positive physical outcome, in particular when short term physical outputs are not yet defined.

5.2. Strengths, limitations and future directions

The present study targeted an innovative research topic, investigating the daily experience of hospitalized patients, using an on-line sampling procedure, and comparing findings from participants with high, moderate and low levels of autonomy. To the best of our knowledge, no study has been thus far conducted on this topic and through these assessment instruments.

This study has nevertheless several limitations. Data were collected cross-sectionally during a standard sampling week. The small sample size is not representative of all Italian hospitalized patients, thus preventing any generalization of results.

However, from a general perspective, the aim of this study was not to draw definitive conclusions, but rather to suggest new research directions. According to the bio-psycho-social approach (Engel, 1977, 1982), and the International Classification of Functioning (ICF, WHO, 2001) the biological, psychological and social dimensions of health should be evaluated, as well as individuals' potentials and resources. Further investigations should take into account the quality of experience of patients with different clinical diagnoses and prognoses.

Moreover, research conducted among health professionals highlighted the relation between a positive therapeutic alliance and patients' adherence. Positive job experiences and the perception of

high self-efficacy beliefs promote innovations, professional engagement, and low levels of stress (Dawson & Carr, 2001; Tesio, 2007), thus fostering patients' high performance in the rehabilitation path. Based on these premises, the synchronous investigation of the daily experience reported by both the medical staff and the patients can shed light on differences and similarities on the experience fluctuation of the two main characters of the rehabilitation program.

5.3. Conclusions

Results offer empirical suggestions for promoting a good quality of daily hospital life and patients' adherence to motor rehabilitation training.

As reported in the literature (Delle Fave & Massimini, 2005; Schmidt et al., 2007) the structural differences between daily activities are likely to be responsible for the associated quality of experience. Concerning the relation between challenges and skills, findings confirmed the role of these variables as predictors of the individuals' quality of experience, and confirmed that the best experiential profile – optimal experience – was associated with the perception of high challenges and high skills in the ongoing activities (Delle Fave et al., 2011; Keller & Bless, 2008).

As highlighted in previous studies (Bassi et al., 2011) and in line with the bio-psycho-social perspective, the experience associated with rehabilitation activities should be more carefully evaluated, in order to promote patients' awareness of their active role in function recovery and in the cultivation of residual abilities, independent of their level of autonomy. The association of rehabilitation activities with positive and engaging experiences can favour autonomous practice in the domestic context, where individuals are prominently responsible for function recovery and development of vicarious abilities. Moreover, in professional settings patients should be exposed to a gradual enhancement of challenges, in order to limit the onset of anxiety and to facilitate a more balanced recovery, adequate to their subjective evaluation.

The prominently negative experiences detected in association with the other daily domains, in particular during leisure and personal care, point to the need for planning changes in the hospital setting, in order to enhance patients' autonomy and active resources mobilization.

For decades, the clinical effectiveness of rehabilitation programs has been measured through three criteria: survival, functional ability and discharge location. Evans and colleagues (1995) highlighted that these criteria were not sufficient in order to prove the success of rehabilitation training: Physical therapy as well as healthy behavioral habits have to be maintained at home or in sub-acute care settings to optimize the recovery of physical functions. Moreover, autonomy in performing ADL should not be the only criterion to evaluate patients' quality of daily life. From

this perspective, analyzing the quality of experience during hospitalization can contribute to promote more person-centered rehabilitation training.

The findings from the present study stress the importance of taking into consideration the person's perspective in assessing rehabilitation programs, in line with the ICF and the rehabilitation guidelines. They also offer indications to rehabilitation teams for structuring individualized programs to promote positive experiences in the context of rehabilitation centers, through meaningful opportunities for action and self-expression in which patients can invest and cultivate personal skills. In this respect, real-time assessment tools can allow teams to monitor the rehabilitation process through follow-ups, evaluate people's perception of challenges and skills, and consequently adjust rehabilitation activities complexity level in order to promote optimal experience in the hospital environment.

Overall, the empirical evidence derived from this study provides further suggestions concerning intervention programs aiming to maintain and improve the quality of life of patients after discharge. In this respect, the theory of flourishing and languishing (Keyes, 1998; Keyes, 2007) represents a relevant interpretative framework. Mental health emerges from the combined synergy of both the hedonic and eudaimonic components of well-being. Complete mental health is defined as flourishing, a condition in which individuals thrive and perceive personal growth. On the other hand, the absence of mental health corresponds to a condition of languishing characterized by emptiness and stagnation in life. Previous studies showed that the risk of mental illness onset (e.g. a major depressive episode) was six times greater among languishing individuals compared with flourishing ones (Keyes 2002). Moreover, languishing and depression - both alone and together - were associated with significant psychosocial impairment, in terms of negative affect, limitations of activities of daily living and workdays lost or cut back. On the contrary, flourishing and absence of mental illness were associated with better psychosocial functioning and physical health, for example with lower incidence of cardiovascular diseases, stomach problems, and arthritis (Keyes 2007).

Intervention programs during hospitalization should take into consideration the importance of performing activities that can promote subjective well-being as well as psychological and social well-being. This can promote the perception of pleasure and satisfaction in daily hospital life, as well as the cultivation of individual resources and abilities and the pursuit of meaningful goals, allowing individuals to recover from illness and at the same time give their contribution to their community.

REFERENCES

- Affleck G., Tennen H., Croog S. & Levine, S. (1987). Causal attribution, perceived benefits and morbidity after a heart attack: an 8 year study. *Journal of Consulting and Clinical Psychology*, 55, 29-35.
- Ahern D.K., Gorkin L., Anderson J.L., Tierney C., Ewart C., Capone R.J., et al. (1990): Biobehavioral variables and mortality or cardiac arrest in the Cardiac Arrhythmia Pilot Study (CAPS). *American Journal of Cardiology* 66,59–62.
- Albrecht G.L., & Devlieger P.J. (1999). The disability paradox: high quality of life against all odds. *Social Science and Medicine*, 48, 977-988.
- Antonovsky A. (1987). *Unraveling the mystery of health: how people manage stress and stay well*. San Francisco, CA: Jossey Bass.
- Appels A., Kop W.J. & Schouten E. (2000). The nature of the depressive symptomatology preceding myocardial infarction. *Behavioral Medicine*, 26,86-89.
- Aristotele “*Etica Nicomachea*” parte I, 6 1907b22-1098a20, trad. it., di M. Zanotto, “*Etica Nicomachea*”, (1986), Rizzoli, Milano.
- Arnold R., Ranchor A., Koëter G., De Jongste M. & Sanderman R. (2005). Consequences of chronic obstructive pulmonary disease and chronic heart failure: The relationship between objective and subjective health. *Social Science & Medicine*, 61, 2144-2154.
- Arving C., Glimeliu B. & Brandberg Y. (2008). Four weeks of daily assessment of anxiety, depression and activity compared to a point assessment with the Hospital Anxiety and Depression Scale. *Quality of Life Research*, 17, 95-104.
- Asakawa K. & Csikszentmihalyi M. (1998). The quality of experience of Asian American adolescents in academic activities: An exploration of educational achievement. *Journal of Research on Adolescence*, 8, 241-262.
- Aspinwall L.G. & Brunhart S.M. (1996). Distinguishing optimism from denial: optimistic beliefs predict attention to health threats. *Personality and social psychology bulletin*, 22, 993-1003.
- Baayen R.H., Davidson D.J. & Bates D.M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of memory and language*, 59, 390-412.
- Bach J.R. & Tilton M.C. (1994). Life satisfaction and well-being measures in ventilator assisted individuals with traumatic tetraplegia. *Archives of Physical and Medical Rehabilitation*, 75, 626-632.
- Bandura A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

- Bandura A. (2004). Health promotion by social cognitive means. *Health Education and Behavior*, 31, 143-164.
- Barefoot J.C. & Schroll M. (1996). Symptoms of depression, acute myocardial infarction, and total mortality in a community sample. *Circulation* 93,1976–1980.
- Bassi M., Ba G., Delle Fave A. & Viganò C. (2011). Quality of experience during psychosocial rehabilitation: a real-time investigation with Experience Sampling Method. *Psychiatric Rehabilitation Journal*, 5, 130-145.
- Bassi M. & Delle Fave A. (2004). Adolescence and the changing context of optimal experience in time: Italy 1986-2000. *Journal of Happiness Studies*, 5:155-179.
- Bassi M., & Delle Fave, A. (2007). The experience of disability: Psychological selection and well-being promotion [trad. It. L'esperienza della disabilità: Selezione psicologica e promozione del benessere]. *Psicologia della Salute*, 1, 31-46.
- Bassi M. & Delle Fave A. (2009). Daily experience and psychological selection in dyadic relationships: monozygotic twins and best friends. In T. Freire (Ed.), *Understanding positive life. Research and practice on positive psychology* (pp.65-84). Lisboa, Portugal: Climepsi Editores.
- Bassi M., Delle Fave A. (2010). Impact of extreme weather conditions on high-altitude climbers' goals and quality of experience. *Journal of Leisure Research*, 3, 21-30.
- Bassi M., Steca P., Delle Fave A. & Caprara G.V. (2007). Academic self-efficacy beliefs and quality of experience in learning, *Journal of Youth and Adolescence*, 36, 301-312.
- Bassi M., Sartori R. & Delle Fave A. (2010). The monitoring of experience and agency in daily life: A study with Italian adolescents. In M. Balconi (Ed.), *Neuropsychology of the sense of agency. From consciousness to action* (pp.81-105). Dordrecht, NL: Springer.
- Bates D. (2005). Fitting linear mixed model in R. *R News*, 5, 27-30.
- Baumann C., Rat A.C., Osnowycz G., Mainard D., Cuny C. & Guillemin F. (2009). Satisfaction with care after total hip or knee replacement predicts self-perceived health status after surgery. *BMC Musculoskeletal Disorders*, 10, 150-158.
- Beny L., Griesmar R. (2001). Kinetec: Device for producing continuous passive motion. United States Patent, 4 December, 2001.
- Brickman P. & Campbell D.T. (1971). Hedonic relativism and planning the good society. In M. H. Apley (Ed.), *Adaptation-level theory: A symposium* (pp. 287-302). New York: Academic Press.
- Burgess C, Cornelius V, Love S, et al., (2005). Depression and anxiety in women with early breast cancer: five year observational cohort study. *British Medical Journal*, 330, 702-5.

- Burkhardt C.S. & Anderson K.L. (2003). The Quality of Life Scale (QOLS): Reliability, Validity and Utilization. *Health and Quality of Life Outcome, 1*, 60-68.
- Bruscia K., Shultis C., Dennerly K. & Dileo C. (2008) Predictors of quality of life in hospitalized cardiac patients, *Journal of Health Psychology, 13(8)*, 982-987.
- Bryk A. & Raudenbush S. (1992). *Hierarchical linear models*. Newbury Park, CA: Sage.
- Burleson B.R. (2003). The experience and effects of emotional support: What the study of cultural and gender differences can tell us about close relationships, emotion, and interpersonal communication. *Personal Relationships, 10(1)*, 1-23.
- Burns T.J., Batavia A.I., Smith Q.W. & Dejong G. (1990). Primary health care needs of person with physical disabilities: What are the research and service priorities?, *Archives of Physical Medicine and Rehabilitation, 71(2)*, 138-143.
- Cacioppo J. & Bernston G. (1999). The affect system: Architecture and operation characteristics. *Current directions in psychological science, 8*, 133-137.
- Cannon W.B. (1932). *The wisdom of the body*, 2nd Edition, 1939, Norton Pubs, New York.
- Cannon W.B. (1942). Woodoo death. *American Anthropologist, 44*, 169-181.
- Caprara G.V., Barbaranelli C., Borgogni L., Petitta L. & Rubinacci, A. (2003). Teachers', school staff's and parents' efficacy beliefs as determinants of attitude toward school, *European Journal of Psychology of Education, 18*, 15-31.
- Carney R.M., Freedland K.E., Eisen S.A., Rich M.W. & Jaffe A.S. (1995). Major depression and medication adherence in elderly patients with coronary artery disease. *Health Psychology 14*, 88-90.
- Ceja, L. & Navarro J. (2009). Dynamics of flow: A nonlinear perspective. *Journal of Happiness Studies, 10*, 665-684.
- Clarke S.G. & Haworth J. (1994). 'Flow' experience in the daily lives of sixth-form college students. *British Journal of Psychology, 85*, 511-523.
- Cleary P.D. & McNeil B.J. (1988). Patient satisfaction as an indicator of quality of life. *Spring 25(1)*, 25-36.
- Cohen S., Tyrrell D.A.J. & Smith A.P. (1991). Psychological stress and susceptibility to the common cold. *New England Journal of Medicine, 325*, 606-612.
- Cohen M.S., Gay C., Kashuba A.D., Blower S., Paxton L. (2007). Narrative review: antiretroviral therapy to prevent the sexual transmission of HIV-1. *Annual Internal Medicine, 146*:591-601.
- Conner C.T., Feldman Barrett L., Bliss-Moreau E., Lebo K. & Kaschub, C. (2003). A practical guide to experience-sampling procedures. *Journal of Happiness Studies, 4*, 53-78.

- Conner T.S., Tennen H., Fleeson W. & Feldman Barrett L. (2009). Experience sampling methods: A modern idiographic approach to personality research. *Social and Personality Psychology Compass*, 3, 1-22.
- Council of Europe (2010). Preventive health care policies in the Council of Europe member states, Report of the Parliamentary Assembly: Social Health and Family Affairs Committee, Doc 12219.
- Csikszentmihalyi M. (1975/2000), *Beyond Boredom and Anxiety*. San Francisco: Jossey-Bass.
- Csikszentmihalyi M. (1990). *Flow. The psychology of optimal experience*. New York: Harper & Row.
- Csikszentmihalyi M. (1997). *Intrinsic motivation and effective teaching: A flow analysis*. In J. Bess (ed.). *Teaching well and liking it: Motivating faculty to teach effectively*, (pp.72-89), Baltimore: John Hopkins University Press.
- Csikszentmihalyi M. & Beattie O. (1979). Life Themes: A theoretical and empirical exploration of their origins and effects. *Journal of Humanistic Psychology*, 19, 677-693.
- Csikszentmihalyi M. & Csikszentmihalyi I. (1988) (Eds.). *Optimal Experience. Psychological studies of Flow in Consciousness*. New York: Cambridge University Press.
- Csikszentmihalyi M. & Larson R. (1984). *Being Adolescent: conflict and growth in the teenage years*, Basic Books, New York.
- Csikszentmihalyi M. & Larson R.W. (1987). Validity and reliability of the Experience Sampling Method. *Journal of Nervous and Mental Disease*, 175, 526-536.
- Csikszentmihalyi M., Larson R.W. & Prescott S. (1977). The ecology of adolescent activity and experience. *Journal of Youth and Adolescence*, 6, 281-294.
- Csikszentmihalyi M. & LeFevre J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56, 815-822.
- Csikszentmihalyi M. & Massimini F. (1985). On the psychological selection of bio-cultural information. *New Ideas in Psychology*, 3, 115-138.
- Csikszentmihalyi M. & Schneider B. (2000). *Becoming adult: How teenagers prepare for the world of work*. New York: Basic Books.
- Csikszentmihalyi M., Rathunde K. & Whalen S. (1993). *Talented Teenagers: the roots of success and failure*. Cambridge University Press, Cambridge
- Davidoff G., Shultz S., Lieb T., Andrews K., Wardner J., Hayes C., et al. (1990). Rehospitalization after initial rehabilitation for acute spinal cord injury: Incident and risks factors, *Archives of Physical Medicine and Rehabilitation*, 71(2), 121-124.

- Dawson J. & Carr A, (2001). Outcomes evaluation in orthopedics. *British Journal of Bone Joint Surgery*, 83,313-315.
- Descartes R. (1647). *Discorso sul metodo*.
- Deci E. & Ryan R. (1980). *Intrinsic motivation and self-determination in human behaviour*, Plenum, New York.
- Deci E.L. & Ryan R.M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268
- Dejong G. & Brannor R. (1998). Trends in the service directed to working-age people with physical disabilities. In V. Mor (Ed.), *Living in the community with disability: Service needs, uses, and systems*, (pp.168-194), New York: Springer.
- Dejong G., Palsbo S.E., Beatty P.W., Jones G.C., Kroll T. & Neri M.T. (2002). The organization and financing of health services for person with disabilities, *Millbank Quarterly*, 80(2), 261-301.
- Delle Fave A. (1996). Esperienza ottimale e fluttuazione dello stato di coscienza: risultati sperimentali. In Massimini, F., Inghilleri, P., Delle Fave, A. (a cura di). *La selezione psicologica umana* (pp.541-568). Milano: Cooperativa Libreria IULM.
- Delle Fave A. (2004). Positive psychology and the pursuit of complexity. Special Issue on Positive Psychology. *Ricerche di Psicologia*, 27, 7-12.
- Delle Fave A. (2007). Theoretical foundations of ESM. In J. Hektner, J. Schmidt, M. Csikszentmihalyi, *Measuring the quality of everyday life. The ESM handbook* (pp.15-28). New York: Sage.
- Delle Fave A. (2010). Development through disability. The unfolding and sharing of psychological resources. In G.W. Burns (Ed.), *Happiness, healing, enhancement. Your casebook collection for applying positive psychology in the therapy* (pp.88-99). Hoboken, NJ: Wiley & Sons.
- Delle Fave A. & Bassi M. (2000). The quality of experience in adolescents' daily life: developmental perspectives, *Genetic, Social and General Psychology Monographs*, 126, 347-367.
- Delle Fave A. & Bassi M. (2003). Italian adolescents and leisure: The role of engagement and optimal experience. In S. Verma & R. Larson (Eds.), *Examining adolescent leisure time across cultures: Developmental opportunities and risks. New directions in child and adolescent development* (pp.79-93). San Francisco: Jossey-Bass.
- Delle Fave A. & Bassi M. (2007). *Psicologia e salute. L'esperienza di utenti e operatori* [Psychology and health. The experience of patients and professionals]. Torino: UTET Università.

- Delle Fave A., Lombardi M. & Massimini F. (2003). Disability and development: Individual and cultural issues. In L. Loewenstein, D. Trent, R. Roth (Eds.), *Catching the Future: women and men in global psychology* (pp.104-113). Lengerich, Germany: Pabst Science Publishers.
- Delle Fave A. & Massimini F. (1992). The ESM and the Measurement of Clinical Change: A case of Anxiety Disorder. In M. deVries (eds.), *The Experience of Psychopathology: Investigating Mental Disorders in their Natural Setting*, Cambridge University Press, Cambridge.
- Delle Fave A. & Massimini F. (1988). Modernization and the Changing Contexts of Flow in Work and Leisure. In M. Csikszentmihalyi., I. Csikszentmihalyi (Eds.), *Optimal Experience. Psychological Studies of Flow in Consciousness*, (pp.193-213). New York: Cambridge University Press.
- Delle Fave A. & Massimini F. (1992). Experience sampling method and the measurement of clinical change: A case of anxiety disorder. In M. deVries (Ed.), *The experience of psychopathology* (p. 280-289). New York: Cambridge University Press.
- Delle Fave A. & Massimini F. (2001). Promozione della salute e riabilitazione: Alcune problematiche transculturali [Health promotion and rehabilitation: Some cross-cultural issues]. In A.L. Comunian & A. Meneghini (Eds.), *Ri-abilitazione. Approccio multidisciplinare alla disabilità fisica* (pp. 74-86). Padova: Edizioni Progetto.
- Delle Fave A. & Massimini F. (2003). Drug Addiction: the paradox of mimetic optimal experience. In J. Henry (Ed.), *European Positive Psychology Proceedings* (pp.31-38). Leicester, UK: British Psychological Society.
- Delle Fave A. & Massimini F. (2004a). Bringing Subjectivity into Focus: Optimal Experience, Life Themes and Person-Centered Rehabilitation. In A. Linley & A.Jhoseph (Eds.), *Positive Psychology in practice*, (pp.35, 581-597) San Francisco: Jossey Bass.
- Delle Fave A. & Massimini, F. (2004b). The cross-cultural investigation of optimal experience, *Ricerche di Psicologia*, 27, 79-102.
- Delle Fave A. & Massimini F. (2005). The Investigation of Optimal Experience and Apathy. Developmental and Psychosocial Implications, *European Psychologist*, 10(4), 264-274.
- Delle Fave A., Massimini F. & Bassi M. (2011). *Psychological selection and optimal experience across cultures*. Dordrecht: Springer Science.
- deVries, M.W. (Ed.) (1992). *The experience of psychopathology - Investigating mental disorders in their natural settings*. Cambridge: Cambridge University Press.
- Donabedian A. (1980). *Explorations in Quality Assessment and Monitoring Vol. 1. The Definition of Quality and Approaches to Its Assessment* . Ann Arbor, MI: Health Administration Press.

- Eisenberger R., Jones J.R., Stinglhamber F., Shanock L. & Randall A.T. (2005). Flow experiences at work: for high need achievers alone? *Journal of Organizational Behavior*, 26, 755-775.
- Engel G.L. (1977). The need for a new medical model: A challenge for biomedicine, *Science*, 196, 129-136.
- Engel G.L. (1982). The biopsychosocial model and medical education, *New England Journal of Medicine*, 306, 802-805.
- Evans R.L., Connis R.T., Hendricks R.D., Haselkorn J.K. (1995). Multidisciplinary rehabilitation versus medical care: A Meta-Analysis. *Social Science & Medicine*, 40(12): 1699-1706.
- Everson-Rose S.A. & Lewis T.T. (2005). Psychosocial factors and cardiovascular diseases. *Annual Review of Public Health*, 26, 469–500.
- Everson S.A., Goldberg D.E., Kaplan G.A., Cohen R.D., Pukkala E., Tuomilehto J. & Salonen J.T. (1996). Hopelessness and risk of mortality and incidence of myocardial infarction and cancer. *Psychosomatic Medicine*, 58, 113–121.
- Everson S.A., Kauhanen J., Kaplan G.A., Goldberg D.E., Julkunen J., Tuomilehto J., & Salonen J.T. (1997). Hostility and increased risk of mortality and acute myocardial infarction: The mediating role of behavioral risk factors. *American Journal of Epidemiology*, 146, 142–152.
- Feldman Barrett L. (1997). The relationships among momentary emotion experiences, personality descriptions, and retrospective ratings of emotion. *Personality and Social Psychology Bulletin*, 23, 1100-1110.
- Fianco A. & Delle Fave A. (2006). Donne migranti e qualità dell'esperienza soggettiva: uno studio con Experience Sampling Method, *Passaggi. Rivista Italiana di Scienze Transculturali*, 11, 101-122.
- Fitzgerald J.F., Moore P.S., Ditters R.S. (1988). The care of elderly patients with hip fracture. Changes since implementation of the prospective payment system. *New English Journal of Medicine*, 319, 1392-7.
- Fitzpatrick R. (2000). Measurement issues in health-related quality of life: challenges for health psychology. *Psychology and Health*, 15, 99-108.
- Folkman S. (1997). Positive psychological states and coping with severe stress. *Social Science & Medicine* 45(8): 1207–1221.
- Folkman S & Moskowitz J.T. (2000). Stress, positive emotions and coping. *Current directions in Psychological Science*, 9, 115-118.
- Ford H., Trigwell P. & Johnson M. (1998). The nature of fatigue in multiple sclerosis. *Journal of Psychosomatic Research*, 45, 33-38.

- Fortinsky R.H., Bohannon R.W., Litt M.D., Tennen H., Maljanian R., Fifield J., et al., (2002). Rehabilitation therapy self-efficacy and functional recovery after hip fracture. *International Journal of Rehabilitation Research*, 25, 241-246.
- Frasure-Smith N., Lesperance F. & Talajic M. (1993). Depression following myocardial infarction. *JAMA*, 270,1819-1825.
- Franchignoni F., Ottonello M., Benevolo E., Tesio L. (2002). Satisfaction with hospital rehabilitation: is it related to life satisfaction, functional status, age or education? *Journal Rehabilitation Medicine*, 34, 105-108.
- Frasure-Smith N., Lesperance F. & Talajic M. (1995). The impact of negative emotions on prognosis following myocardial infarction: is it more than depression? *Health psychology*, 14, 388-398.
- Freedland K.E., Rich M.W., Skala J.A. et al., (2003). Prevalence of depression in hospitalized patients with congestive heart failure. *Psychosomatic Medicine* 65, 119-128.
- Friedman H.S. (2011) (Ed.). *The Oxford Handbook of Health Psychology*. New York: Oxford University Press.
- Friedman H.S. & Adler N.E. (2011). The intellectual roots of health psychology. In H.S. Friedman (Ed.), *The Oxford Handbook of Health Psychology* (pp. 3-14). New York: Oxford University Press.
- Frihagen F., Grotle M., Madsen J.E., Wyller T.B., Mowinckel P. & Nordsetten P. (2008). The treatment of femoral hip fracture. *International Journal of Care Injured*, 39, 1147-1156.
- Fuhrer R., Antonucci T.C. & Dartigues J.F. (1992). The co-occurrence of depressive symptoms and cognitive impairment in a French community: Are there gender differences? *European Archives of Psychiatry and Clinical Neuroscience*, 242, 161-171.
- Furstenberg A.L. & Mezey M.D. (1988). Community residence one year after hip fracture. *American Journal of Applied Gerontology* 7, 193-204.
- George L.K. (2010). Still happy after all these years: research frontiers on subjective well-being in later life. *Journal of Gerontology: Social Sciences*, 65B(3), 331–339.
- Goldstein, H. (1987). *Multilevel models in educational and social research*. London: Griffin.
- Greene, B. A., & Miller, R. B. (1996). Influences on achievement: Goals, perceived ability, and cognitive engagement. *Contemporary Educational Measurement*. 21, 181-192.
- Granger C.V., Hamilton B.B., Gresham G.E. & Kramer A.K. (1984). The Stroke Rehabilitation Outcome Study: Part II. Relative merits of the total Barthel Index Score and a four item subscore in predicting patient outcomes. *Archive of Physical Medicine Rehabilitation*, 70, 100 –3.

- Haworth J. & Evans (1995). *Psychological research: innovative methods and strategies*, New York: Routledge.
- Hektner J.M., Schmidt J.A. & Csikszentmihalyi M. (2007). *Experience Sampling Method: measuring the quality of everyday life*, Sage Publication.
- Heinemann A.W., Kirk P., Hastie B.A., Semik P., Hamilton B.B., Linacre J.M., Wright B.D., Granger C.V. (1977). Relationships between disability measures and nursing effort during medical rehabilitation for patients with traumatic brain injury and spinal cord injury. *Archive of Physical Rehabilitation*, 78(2), 143-149.
- Hernández-Quevedo C., Jones A., Lòpez-Nicolàs A. & Rice N. (2006). Socioeconomic inequalities in health: A comparative longitudinal analysis using the European Community Household Panel. *Social science & medicine*, 63, 1246-1261.
- Hirsch C, Sommers L, Olsen A, Mullen L, Winograd C (1990). The natural history of functional morbidity in hospitalized older patients. *Journal of the American Geriatrics Society* 38, 1296-1303.
- Hoenig H.M., Rubenstein L.Z. (1991). Hospital-associated deconditioning and dysfunction. *J. Am. Geriatr. Soc.* 39, 220–222.
- Holman, H. R., & Lorig, K. (1992). Perceived self-efficacy in self-management of chronic disease. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 305-323). Washington, DC: Hemisphere.
- Holmberg S., Thelin A., Stjernstrøm EL. (2004). Relationship of sense of coherence to other psychosocial indices. *European Journal of Psychological Assessment*, 20(4), 227–236
- Hormuth S.E. (1986), The sampling of experience in situ, *Journal of Personality*, 54, 262-293.
- Isen A.M. (1987). *Positive affect, cognitive processes and social behaviour*. In L. Berkowitz (Ed.), *Advances in Experimental social psychology*, (pp. 203-253). New York Academic Press.
- Isen A.M. (1999) *On the relationship between affect and creative problem solving*. In S. Russ (ed.), *Affect, creative experience and psychological adjustment*, (pp. 3-17), Philadelphia: Taylor & Francis.
- Isen A.M. (2000). *Positive affect and decision making*. In M. Lewis & J. Haviland (Eds.), *Handbook of emotions*, 2nd Ed., (pp.417-435), New York: Guilford Press, New York.
- Isen A.M. & Levin P.F. (1972) The effect of feeling good on helping: cookies and kindness. *Journal of personality and social psychology*, 21, 1413-1426.

- Isen A.M. & Geva N. (1987). The influence of positive affect on acceptable level of risk: the person with a large canoe has a large worry. *Organizational behavior and human decision processes*, 39, 145-154.
- Iwasaki Y. & Mannell, R.C. (2000). Hierarchical dimensions of leisure stress coping. *Leisure Sciences*, 22, 163–181.
- Hox J.J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah, NJ: Erlbaum.
- Jackson S.A. & Csikszentmihalyi M. (1999). *Flow in sports. The keys to optimal experiences and performances*. Champaign, IL: Human Kinetics.
- Jette A.M., Harris B.A., Cleary P.D. & Campion E.W. (1987). Functional recovery after hip fracture. *Archives of Physical Medicine and Rehabilitation*, 68,735-740.
- Jones K. (2004). Schism ad heresy in the development of orthodox medicine: The threat to medical hegemony. *Social Science & Medicine*, 58, 703-712.
- Keller J. & Bless H. (2008). When positive and negative expectancies disrupt performance: Regulatory focus as a catalyst. *European Journal of Social Psychology*, 38, 187-212.
- Kemeny M.E. (2011). Psychoneuroimmunology. In H.S. Friedman (Ed.), *The Oxford handbook of health psychology*. (pp.131-150), New York: Oxford University Press.
- Keyes C.L.M. (1998). Social well-being. *Social Psychology Quarterly*, 61, 121-140.
- Keyes C.L.M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Research*, 43, 207-222.
- Keyes C.L.M. (2007). Promoting and protecting mental health as flourishing. A complementary strategy for improving national mental health. *American Psychologist*, 62, 95-108.
- King L. & Miner K. (2000). Writing about the perceived benefits of traumatic life events: Implications for physical health. *Personality and Social Psychology Bulletin*, 26, 220-230.
- Kinder L.S., Kamarck T.W., Baum A., Orchard T.J (2002). Depressive symptomatology and coronary heart disease in type I diabetes mellitus: a study of possible mechanisms. *Health Psychology*. 21, 542-52.
- Kotter-Grühn D. & Smith J. (2011). When time is running out: Changes in positive future perception and their relationship to changes in well-being in old age, *Psychology and Aging*, 26(2), 181-187.
- Krantz, D.S. & McCeney M.K. (2002). Effects of psychological and social factors on organic disease: A critical assessment of research on coronary heart disease. *Annual Review of Psychology*, 53, 341–369.

- Kubzansky, L.D., Kawachi, I., Spiro, III, A., Weiss, S.T., Vokona, P.S., & Sparrow, D. (1997). Is worrying bad for your heart? A prospective study of worry and coronary heart disease in the normative aging study. *Circulation*, *95*, 818-824.
- Kubey R. & Csikszentmihalyi M. (1990). Television and the quality of life: How viewing shapes everyday experience. Hillsdale, NJ: Lawrence Erlbaum Associates
- Kunz-Ebrecht, S.R., Kirschbaum, C., Marmot, M., Steptoe, A. (2004). Differences in cortisol awakening response on work days and weekends in women and men from the Whitehall II cohort. *Psychoneuroendocrinology*, *29*, 516-528.
- Larson R. (1997). The emergence of solitude as a constructive detail of experience in early adolescence, *Child development*, *68*, 80-93.
- Larson, R. (2000). Toward a psychology of positive youth development. *American Psychologist*, *55*(1), 170-183.
- Larson R. & Delespaul O. (1992). Analysing experience sampling data: a guidebook for the perplexed. In M. W deVries (eds.), *The experience of psychopathology: investigating mental disorders in the natural setting*, (pp.58-78), New York: Cambridge University Press.
- Larson R.W. & Verma S. (1999). How children and adolescents spend time across the world: Work, play, and developmental opportunities. *Psychological Bulletin*, *125*, 701-736.
- Lazarus R. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lazarus R. & Folkman S. (1984). *Stress, appraisal, and coping*, New York: Springer.
- Le Doux J. (2002), *Synaptic self: how our brains become who we are*, Viking Penguin, New York.
- Leshan L. (1994). *Cancer as a turning point: a handbook for people with cancer, their families and health professionals*. Bath UK: Gateway Books.
- Levin B., & Browner C. (2005). The social production of health: Critical contributions from evolutionary, biological, and cultural anthropology. *Social Science & Medicine*, *61*, 745-750.
- Lorig K.R., Chastain R.L., Ung E., Shoor S. & Holman H.R. (1989). Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. *Arthritis and Rheumatism*, *32*, 37-44.
- Lorig K.R., Mazonson P.D. & Holman H.R. (1993). Evidence suggesting that health education for self-management in patients with chronic arthritis has sustained health benefits while reducing health care costs. *Arthritis and Rheumatism* *36*, 439-446.
- Lutz B.J. & Browers B.J. (2005). Disability in Everyday Life, *Qualitative Health Research*, *15*, 1037-1054.

- Mahoney F.I., Barthel D. (1965). Functional evaluation: The Barthel Index. *Maryland State Medical Journal*, 14, 56-61
- Martin J.J. & Cutler K. (2002). An exploratory study of flow and motivation in theatre actors. *Journal of Applied Sport Psychology*, 14, 344–352.
- Massimini F., Csikszentmihalyi M. & Carli M. (1987). Optimal experience: a tool for psychiatric rehabilitation, *Journal of Nervous and Mental disease*, 175-179.
- Massimini F. & Delle Fave A. (2000). Individual development in a bio-cultural perspective. *American Psychologist*, 55, 24-33.
- Massimini F., Inghilleri P. & Delle Fave A. (Eds.) (1996). *La selezione psicologica umana* [Human psychological selection]. Milano: Coop. Libreria IULM.
- Masten A.S., Reed M.G.J. (2002). *Resilience in development*. In C.R. Snyder e S.J. Lopez (Eds.), *Handbook of Positive Psychology* (pp. 74-87), New York: Oxford Univ. Press.
- McPhail S. & Haines T. (2010). Response shift, recall bias and their effect on measuring change in health-related quality of life amongst older hospital patients. *Health and Quality of Life Outcomes*, 8, 65-74.
- Merluzzi T.V. & Sanchez M.A. (1997). Assessment of self-efficacy and coping with cancer: Development and validation of the cancer behavior inventory. *Health Psychology*, 16, 163-170.
- Meyer A. (1948). Selected papers. In A. Lief (Ed.), *The commonsense psychiatry of Dr. Adolf Meyer*. New York: McGraw Hill.
- Ministry of health (2003). *Censimento delle strutture riabilitative presenti sul territorio nazionale*. www.salute.gov.it
- Ministry of Health (2009). *Rapporto annuale dei ricoveri ospedalieri anno 2008*. www.salute.gov.it
- Ministry of Health (2010). *Relazione sullo Stato Sanitario del paese 2009-2010*. www.salute.gov.it
- Ministry of Health (2012). *Attività di ricovero 2010. Flusso nazionale delle schede di dimissione ospedaliera. Relazione preliminare*. www.salute.gov.it
- Ministry of Work, Health and Social Policies (2009). *Relazione sullo stato sanitario del paese 2007-2008*. www.salute.gov.it
- Molinari E., Compare A. & Parati G. (2007), *Mente & cuore, clinica psicologica della malattia cardiaca*. Erikson.
- Moneta G.B. (2004). The flow model of intrinsic motivation in Chinese: Cultural and personal moderators. *Journal of Happiness Studies*, 5, 181-217.

- Morasso G., Di Leo S., Grassi L. (2002). La psiconcologia: stato dell'arte. In Bellani M.L., Morasso G., Amadori D., Orrù W., Grassi L., Casali P.G., Bruzzi P. (Eds.), *Psiconcologia*. (pp. 21-35), Milano: Masson Edizioni.
- Montes Pena F., de Faria Modenesi R., Teixeira Piraciaba M.C., Magliano Marins R., Barros Muniz de Souza L., Ferreira Barcelos A. et al., (2011). Prevalence and variables predictive of depressive symptoms in patients hospitalized for hearth failure. *Cardiology Journal*, 18(1), 18-25.
- Morton C.C. (1993). Hazard of Hospitalization of the Elderly. *Annals of Internal Medicine*, 11, 219-223.
- Morton C. & Creditor M.D. (1993). Hazards of Hospitalization of the Elderly. *Annals of Internal Medicine*, 118(3), 219-223.
- Moser D.K. & Dracup K. (1996). Is anxiety early after myocardial infarction associated with subsequent ischemic and arrhythmic events? *Psychosomatic Medicine*, 58, 395-401.
- Nakamura J., & Csikszentmihalyi M. (2009). Flow theory and research. In S.J. Lopez & C.R. Snyder (Eds.), *Handbook of positive psychology* (pp. 195-206). New York: Oxford University Press.
- Napa Scollon C., Kim-Prieto C., Diener E. (2003). Experience sampling: Promises and pitfalls, strengths and weaknesses. *Journal of Happiness Studies*, 4, 5-34.
- Narayan K.M.V., Boyle J.P., Thompson T.J., Gregg E.W. and Williamson D.F. (2003). Lifetime risk for diabetes mellitus in the United States. *Journal of the American Medical Association*, 290, 1884-1890.
- Nguyen Thi P.L., Briancon S., Empeur F. & Guillemin F (2002). Factors determining inpatients satisfaction with care. *Social Science & Medicine* 54, 493-504.
- Osterberg L. & Blaschke T (2005). Adherence to medication. *The New England Journal of Medicine*, 353, 487-497.
- Parkay F., Greenwood G., Olejnik S. & Proller N. (1988). A study of the relationship among teacher efficacy, locus of control, and stress. *Journal of Research and Development in Education*, 21, 13-22.
- Persson D., Eklund M. & Isacson A. (1999). The experience of everyday occupations and its relation to sense of coherence - a methodological study, *Journal of Occupational Science*, 6, 13-26.
- Plato Timaeus, 360 B.C., 88b.

- Prenda K.M. & Lachman M.E. (2001). Planning for the future: A life management strategy for increasing control and life satisfaction in adulthood, *Psychology and Aging*, 16, 206-216.
- Raudenbush S.W. & Bryk A.S. (2002). *Hierarchical Linear Models* (Second Edition). Thousand Oaks: Sage Publications.
- Robinson-Smith G., Johnston M.V., Allen J. (2000). Self-care self-efficacy, quality of life, and depression after stroke. *Archives of Physical Medicine and Rehabilitation* 81(4), 460-464.
- Russell J.A. & Carroll J.M. (1999). On the bipolarity of positive and negative affect. *Psychological Bulletin*, 125, 3-30.
- Ryan R.M. & Deci E.L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141-166.
- Ryan R.M., Patrick H., Deci, E.L. & Williams G.C. (2008). Facilitating health behavior change and its maintenance: Interventions based on self-determination theory. *The European Health Psychologist*, 10, 2-5.
- Robinson-Smith G., Johnson M.V., Allen J. (2000). Self-care self-efficacy, quality of life and depression after stroke. *Archives of Physical Medicine and Rehabilitation*, 81, 460-464.
- Rolland J.S. (1994) *Families, illness and disability: an integrative treatment model*. New York: Basic Books.
- Rolland J.S. (2005). Cancer and the family: an integrative model. *Cancer*, 104 (11), 2584-2595.
- Ryff C.D. Singer B.H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies*, 9(1), 13-39.
- Saravanan B., Manigandam C., Macaden A., Tharion G. & Bhattacharji S. (2001). Re-examining the psychology of spinal cord injury: A meaning-centered approach from a cultural perspective. *Spinal Cord*, 39, 323-326.
- Scheier M.F., Matthews K.A., Owens G.F., Magovern G.J., Lefebvre R.C., Abbott R.A. & Carver C.S. (1989). Dispositional optimism and recovery from coronary artery bypass surgery: the beneficial effects on physical and psychological well-being. *Journal of Personality and Social Psychology*, 57, 1024-1040.
- Schimmack U. (2003). Affect measurement in experience sampling research, *Journal of Happiness Studies*, 4, 79-106.
- Schmidt J., Shernoff D. & Csikszentmihalyi M. (2007). Individual and situational factors related to the experience of flow in adolescence: A multilevel approach. In A.D. Ong & M. van Dulmen (Eds.), *The handbook of methods in positive psychology* (pp.542-558). New York: Oxford University Press.

- Schwarzer R. & Fuchs R. (1995). *Self-Efficacy and health behaviours*. In M. Conner, & P. Norman (Eds.), *Predicting health behaviour: Research and practice with social cognition models*, (pp. 163-196), London: Open University Press.
- Seligman M.E.P. & Csikszentmihalyi M. (2000). Positive psychology. An introduction. *American Psychologist*, 1, 5-14.
- Selye H. (1956). *The stress of life*. New York: McGraw-Hill.
- Shah S., Vanclay F., Cooper B. (1989). Improving the sensitivity of the Barthel Index for stroke rehabilitation. *Journal of Clinical Epidemiology*, 42, 703-9.
- Sheldon H.A., Wheeler J., Worden R.H. & Cheadle M.J. (2003). An analysis of the roles of stress, temperature, and pH in chemical compaction of sandstones: *Journal of Sedimentary Research*, 73, 64-71.
- Snaith R.P. (2003). The Hospital Anxiety and Depression Scale. *Health and Quality of Life Outcomes*. 1, 29-32.
- Sodergren S.C. & Hyland M.E. (2000). What are the positive consequences of illness? *Psychology and Health*, 15, 85-97.
- Stebbins R.A. (2001). The costs and benefits of hedonism: Some consequences of taking casual leisure seriously. *Leisure Studies*, 20, 305-309.
- Stebbins R.A. (2007). *Serious Leisure: A Perspective for Our Time*, Transaction, New Brunswick, NJ.
- Steele J.P. & Fullagar C.J. (2009). Facilitators and outcome of student engagement in a college setting. *Journal of Psychology*, 143, 5-27.
- Steffens D.C., O'Connor C.M., Jiang W.J., Pieper C.F., Kuchibhatla M.N., Arias R.M., et al., (1999). The effect of major depression in functional status in patients with coronary artery disease. *Journal of American Geriatric Society* 47, 319-322.
- Steptoe A. & Brydon L. (2009). Emotional triggering of cardiac events. *Neuroscience and Behavioral Reviews*, 33, 63-70.
- Stiegelis H.E., Hagedoorn M., Sanderman R., Bennenbroek F.T., Buunk B.P., van den Bergh A.C., Botke G., Ranchor A.V. (2004). The impact of an informational self-management intervention on the association between control and illness uncertainty before and psychological distress after radiotherapy. *Psycho-Oncology*, 13, 248-259.
- Stokart Z., Cavallo M., Fianco A. & Lombardi M. (2007). Esperienza ottimale e identità femminile: uno studio transculturale su tre gruppi di adolescenti [Optimal experience and female identity: A

- cross-cultural study with three groups of adolescents]. In A. Delle Fave (Ed.), *La condivisione del benessere. Il contributo della Psicologia Positiva* (pp.325-344). Milano: Franco Angeli.
- Stone A.A., Kessler R.C. & Haythornwaite J.A. (1991). Measuring day events and experiences: decisions for the researcher, *Journal of personality*, 59, 575-607.
- Sullivan M. (2003). The new subjective medicine: taking the patient's point of view on health care and health. *Social Science & Medicine*, 56, 1595-1604.
- Takeyachi Y., Konno S., Otani K., Yamauchi K., Takahashi I., Suzukamo Y., et al., (2003). Correlation of Low Back Pain With Functional Status, General Health Perception, Social Participation, Subjective Happiness, and Patient Satisfaction. *SPINE* 28(13), 1461-1467.
- Tedeschi R. G. & Calhoun L.G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9, 455-471.
- Tennen H. & Affleck G. (2002). Benefit-finding and benefit-reminding. In C.R. Snyder & S.J. Lopez (Eds.), *Handbook of positive psychology* (1st ed., pp.584-597). New York: Oxford University Press.
- Tennen H., Affleck G. & Mendola R. (1991). Coping with smell and taste disorders. In Getchell, T.V., Doty, R.L., Bartoshuk, L.M. & Snow, J.B. (Eds.), *Smell and Taste in Health and Disease*. Raven Press, New York.
- Tesio L. (1995). Independence: the core and currency of functional assessment in rehabilitation medicine. *Acta Gerontology*, 45,133-136.
- Tesio L. (2003). Measuring behaviors and perceptions. Rasch analysis as a tool for rehabilitation research. *Journal of Rehabilitation Medicine*, 35, 105-115.
- Tesio L. (2007). Functional assessment in rehabilitation medicine: principles and applications. *Eura Medicophys* 43, 515-523.
- Tesio L, Granger CV, Fiedler R (1997) A unidimensional pain-disability scale for low back pain syndromes. *Pain* 69, 269-278
- Trull T.J. & Ebner-Priemer U.W. (2009). Using experience sampling methods/ecological momentary assessment (ESM/EMA) in clinical assessment and clinical research: Introduction to the Special Section. *Psychological Assessment*, 21, 457-462.
- Verma S., Larson R. (Eds.) (2003). *Examining adolescent leisure time across cultures: Developmental opportunities and risks. New Directions in child and adolescent development*, San Francisco: Jossey Bass.
- Weinberg N. (1988). Another perspective: Attitudes of people with disabilities. In H.E. Yuker (Ed.), *Attitudes toward persons with disabilities* (pp. 141-153). New York: Springer

- Wiklund I. & Talley N. (2003). Update on health-related quality of life in patients with gastroesophageal reflux disease. *Pharmacoeconomics Outcomes Research*, 3, 341-350.
- Williams G. & Deci, E. (1998). The importance of supporting autonomy in medical education *Annals of Internal Medicine*, 129, 303-308.
- Williams G., Rodin G., Ryan R., Grolnick W., Deci E. (1998). Autonomous regulation and long-term medication adherence in adult patients. *Health Psychology*, 17, 269-276.
- Williams G.C., Patrick H., Niemiec C.P., Ryan R.M., Deci E.L. & McGregor Lavigne H.(2011). The smoker's health project: A self-determination theory intervention to facilitate maintenance of tobacco abstinence. *Contemporary Clinical Trials*. Doi: 10.1016/j.cct.2011.03.002.
- Wolff H.G. (1953). *Stress and Disease*. Springfield IL: Charles C. Thomas.
- World Health Organization (1946). Preamble to the Constitution of the World Health Organization. *Official records of the World Health Organization*, no. 2, p.100.
- World Health Organization (1979). *The ICD-9 classification of diseases*. Geneva: WHO.
- World Health Organization (1980). *International Classification of Impairments, Disability and Handicaps*. Geneva: WHO.
- World Health Organization (1992). *The ICD-10 classification of mental behaviors disorders: Clinical descriptions and diagnosis guidelines*. Geneva: WHO.
- World Health Organization. (2001). *International Classification of Functioning, Disability and Health (ICF)*. Geneva: WHO.
- World Health Organization (2004). *Promoting mental health: Concepts, emerging evidence, practice* (Summary report). Geneva: WHO.
- World Health Organization (2010). *Community Based Rehabilitation (CBR) Guidelines*. Geneva: WHO.
- Wright J., Franks A., Ayers P., Jones K., Roberts T., Whitty P. (2002). Public health in hospital: The missing link in health improvement. *Journal of Public Health Medicine* 24, 152-155.
- Ziegelstein R.C., Fauerbach J.A., Stevens S.S. et al., (2000). Patients with depression are less likely to follow recommendations to reduce cardiac risk during recovery from a myocardial infarction. *Archival of Internal Medicine*, 160, 1818-1823.
- Zigmond A.S., Snaith R.P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scand*, 67, 361-370.

APPENDICES

Appendix 1. Experience Sampling Method

Date _____ Time beeped _____ Time answered _____

AS YOU WERE BEEPED::

What were you thinking about? _____

Where were you? _____

What was the main thing you were doing? _____

(***) _____

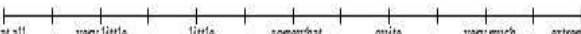
Why were you doing it? I wanted to () I had to ()
 I had nothing else to do ()

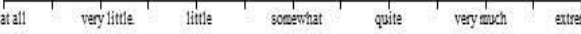
What else were you doing? _____

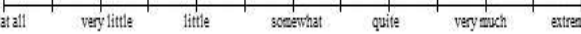
	not at all	very little	little	somewhat	quite	very much	extremely
How much were you concentrating?							
Was it hard to concentrate?							
How self-conscious were you							
Were you in control of the situation?							

Describe how you felt as you were beeped:


	not at all	very little	little	somewhat	quite	very much	extremely
Alert							
Happy							
Apathetic							
Strong							
Lonely							
Cheerful							
Anxious							
Sociable							
Angry							
Drowsy							
Active							
Bored							
Involved							
Content							
Excited							
Sad							
Free							
Tired							
Friendly							
Creative							
Obligated							
Relaxed							
Close							
Clear ideas							

Challenge of the activity 

Considering your skills and abilities, were you able to face the situation? 

Did you wish you had been Doing something else? 

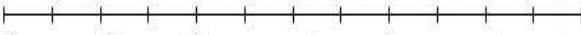
What? _____

Was anything at stake for You in the activity? 

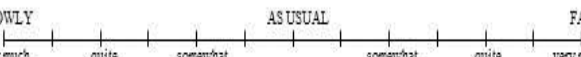
What? _____

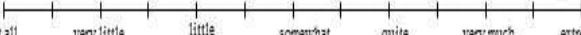
AS YOU WERE BEEPED


Who were you with? _____

Did you wish you had been With somebody else? 

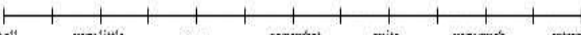
Whom with? _____

Time was passing: 

Did you feel satisfied with yourself? 

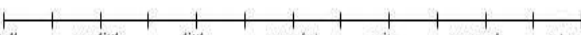
Did you wish you had been somewhere else? 

Where? _____

Did you have any particular Physical sensation? 

Which one's? _____

The sensation was: pleasant () unpleasant ()

Was the activity you were doing important for some overall life goals? 

Which one's? _____

SINCE YOU WERE LAST BEEPED:

Has anything happened or have you done anything that could have affected the way you Feel now? What? _____

It was: positive () negative ()

Appendix 2. Coefficients (and standard errors) of the ML model

Table 20: Coefficients (and standard errors) of the ML model (variables: concentration / in control)

	Fixed effect estimate	SE	T	p
Concentration				
HBI	-0.49	07.1	-0.68	.49
MBI	-0.83	0.65	-1.27	.2
Interactions	1.03	0.42	2.43	.01
Leisure	0.59	0.48	1.22	.22
Rehabilitation	0.97	0.49	1.97	.04
Group HBI / Interactions	0.50	0.57	0.88	.37
Group MBI / Interactions	0.32	0.51	0.63	.52
Group HBI / Leisure	0.60	0.65	0.91	.35
Group MBI / Leisure	0.22	0.59	0.37	.70
Group HBI / Rehabilitation	1.46	0.64	2.26	.02
Group MBI / Rehabilitation	0.77	0.60	1.27	.20
In control				
HBI	0.19	0.84	0.23	.81
MBI	-0.45	0.77	-0.59	.55
Interactions	0.36	0.26	1.35	.17
Leisure	0.21	0.24	0.89	.36
Rehabilitation	0.33	0.33	1.01	.3
Group HBI / Interactions	0.38	0.36	1.03	.3
Group MBI / Interactions	0.25	0.32	0.78	.43
Group HBI / Leisure	0.17	0.33	0.51	.6
Group MBI / Leisure	0.28	0.29	0.96	.33
Group HBI / Rehabilitation	0.81	0.43	1.86	.06
Group MBI / Rehabilitation	0.19	0,40	0.48	.62

Table 21: Coefficients (and standard errors) of the ML model (variables: involvement / active)

	Fixed effect estimate	SE	T	p
Involvement				
HBI	-0.67	0.70	-0.9	.341
MBI	-0.4	0.64	-0.62	.53
Interactions	1	0.32	3.08	.002
Leisure	0.3	0.29	1.03	.29
Rehabilitation	0.94	0.40	2.34	.02
Group HBI / Interactions	0.03	0.44	0.07	.94
Group MBI / Interactions	0.42	0.39	1.06	.28
Group HBI / Leisure	0.21	0.41	0.52	.6
Group MBI / Leisure	0.12	0.37	0.33	.73
Group HBI / Rehabilitation	1.12	0.53	2.10	.03
Group MBI / Rehabilitation	0.23	0.49	0.47	.63
Active				
HBI	-1.11	0.66	-1.66	.09
MBI	-0.86	0.61	-1.40	.15
Interactions	0.13	0.37	0.34	.72
Leisure	0.53	0.34	1.56	.11
Rehabilitation	1.28	0.46	2.75	.01
Group HBI / Interactions	0.35	0.51	0.69	.48
Group MBI / Interactions	0.46	0.45	1	.31
Group HBI / Leisure	-0.31	0.47	-0.66	.50
Group MBI / Leisure	-0.98	0.42	-2.31	.02
Group HBI / Rehabilitation	0.84	0.61	1.37	.17
Group MBI / Rehabilitation	-1.18	0.56	-2.07	.03

Table 22: Coefficients (and standard errors) of the ML model (variables: happy / wish to do the activity / goals)

	Fixed effect estimate	SE	T	p
Happy				
HBI	-0.41	0.66	-0.61	.53
MBI	-0.47	0.61	-0.76	.44
Interactions	0.78	0.16	4.77	.001
Leisure	0.21	0.15	1.39	.16
Rehabilitation	0.19	0.19	0.96	.33
Wish to do the activity				
HBI	0.70	0.80	0.87	.38
MBI	0.39	0.74	0.53	.59
Interactions	0.40	0.29	1.39	.16
Leisure	0.85	0.27	3.13	.001
Rehabilitation	-0.05	0.35	-0.16	.87
Future goals				
HBI	0.69	1.04	0.66	.5
MBI	0.90	0.95	0.95	.34
Interactions	-0.15	0.60	-0.25	.79
Leisure	-0.02	0.48	-0.05	.95
Rehabilitation	3.09	1.21	2.53	.01
Group HBI / Interactions	-0.36	0.81	-0.45	.65
Group MBI / Interactions	1.15	0.72	1.57	.11
Group HBI / Leisure	-1.38	0.67	-2.03	.04
Group MBI / Leisure	-0.73	0.60	-1.22	.22
Group HBI / Rehabilitation	1.19	1.59	0.75	.45
Group MBI / Rehabilitation	0.12	1.48	0.08	.93

Table 23: Coefficients (and standard errors) of the ML model (bivariate model)

	Fixed effect estimate	SE	T	p
HBI	0.26	.20	1.28	.2
MBI	-0.33	.19	-1.72	.08
Interactions	-0.15	.15	-0.99	.32
Leisure	-0.13	.12	-1.10	.27
Rehabilitation	-0.19	.21	-0.88	.38
Group HBI / Interactions	0.21	.20	1.03	.30
Group MBI / Interactions	0.34	.18	1.85	.06
Group HBI / Leisure	0.18	.17	1.11	.27
Group MBI / Leisure	0.36	.15	2.43	.015
Group HBI / Rehabilitation	0.39	.28	1.37	.18
Group MBI / Rehabilitation	0.53	.26	2.01	.04
Challenges / Interactions	0.56	.16	3.62	.001
Challenges / Leisure	0.23	.14	1.59	.11
Challenges / Rehabilitation	0.98	.19	5.12	.001
Challenges / HBI / Interactions	-0.32	.22	-1.48	.14
Challenges / MBI / Interactions	-0.26	.19	-1.38	.17
Challenges / HBI / Leisure	-0.09	.20	-0.44	.66
Challenges / MBI / Leisure	-0.25	.17	-1.44	.15
Challenges / HBI / Rehabilitation	0.31	.25	1.24	.21
Challenges / MBI / Rehabilitation	-0.62	.23	-2.66	.01