László Harmat · Frans Ørsted Andersen
Fredrik Ullén · Jon Wright
Gaynor Sadlo *Editors*

Flow Experience

Empirical Research and Applications

Springer

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Preface

This book is the work of members of The European Flow Researchers Network (EFRN). The EFRN is the first network of its kind in the world. Together we are aiming to develop a common international understanding of the concept and measurement of flow and to stimulate empirical flow research. We believe that these aims are important, not only for academics and students but ultimately for people everywhere whose well-being could be enhanced through experiencing flow. This book represents an important step forward for the EFRN, as it shares our current knowledge regarding flow theory and research and how we are applying what we have learnt in everyday life to promote people's well-being.

The EFRN is an inclusive, dynamic group of individuals who share a passion for flow and believe that is through cooperation and partnership that we can foster scientific progress. We met for the first time in Trier in late November 2012, and since then have ensured that we meet together every year to develop formal and informal opportunities for exchange, cooperation and research. We hope that you are fascinated and inspired by what you read. If you are and would like to join us, please get in touch.

We would like to thank all of the contributors to this book, who are all colleagues within the Network, for sharing their wealth of expertise in and experience in flow research. The contributors were chosen to help demonstrate the range of empirical research and methodologies used within flow research and the different areas of our lives in which flow can occur. We think that they have done this admirably. We are greatful to Emma Louise for her assistant at the final stages of the editorial work. On behalf of the Network, we would also like to thank Springer for the opportunity to publish our work and for all of the support and guidance they have given us.

Since Csikszentmihalyi first described flow and its phenomonology in the mid-1960s, the construct has developed significantly; however, much of the work in the field has been focused on theoretical and philosophical issues. In this volume, we have aimed to focus upon empirical work within flow research. The book is one step towards relating flow research to the main scientific traditions in psychology and psychophysiology, integrating it into the mainstream work of these fields.

In Part I, Chap. 1 provides an overview of flow research that clarifies what is now understood by optimal experience. A co-constructionist perspective of human experience as an interaction between the biological and cultural environment is presented. The chapter introduces us to the processes of psychological selection, emphasizing the role of flow experiences and the meaning given to activities in developing individuals' skills and competencies. Possible individual and environmental explanations for the differences between people in perceiving opportunities for attaining optimal experiences are discussed including: health conditions, social structure and cultural constraints; work and leisure; and family and school environments. The role of both talent and deliberate effort in creating opportunities for optimal experience is explored. The rationale for long-term research that could shed light on the evolutionary significance and role of flow within the dynamics between the individual and the environment is explained.

In Part II, authors discussed flow in relation to arts and sports performances. Chapter 2 addresses a study aimed at investigating self-regulated practice behaviours and flow dispositions in expert musicians. Associations between self-regulated practice behaviours and flow dispositions were explored. Results showed that flow was predominantly a function of self-regulated behaviours. The chapter ends with implications of the findings for musicians, teachers and researchers. Chapter 3 describes and discusses the experience of flow when professional artists create and learn. The author points out that artistic creation happens in a state of deep concentration, and self-forgetting and flow seem to have a specific purpose within artistic processes: triggering, facilitating and guiding the *flow* of creation.

Sport offers rich opportunities to experience flow by posing both mental and physical challenges. Studies specifically investigating flow in sport were first published in 1992. Chapter 4 reviews the methods commonly used to study flow in sport (i.e., interviews, questionnaires and the experience sampling method) and key research themes (i.e., the experience, occurrence, controllability and correlates of flow in sport). The following chapter (Chap. 5) summarises three studies that explored treadmill running in a laboratory context and measured flow-states via self-report data. The authors highlight the work of Dietrich (2003) who postulates within the frame of Transient Hypofrontality Theory (THT) that flow-states are a result of a down-regulated prefrontal cortex. The results, reported in this chapter, provide indirect evidence for the hypothesis that prolonged exercise might result in a state of transient hypofrontality.

The focus of Part III is the association between flow and achievement. Chapter 6 discusses the complex question of how flow relates to creativity. The empirical literature on creativity and flow is summarised and discussed critically in relation to two influential theoretical frameworks: dual-process theories of creativity and the hypofrontality model of flow. The chapter identifies lacunae in our current understanding and ends with several specific suggestions for future empirical work. A concept that is closely related to creativity is intuition. Chapter 7 continues the discussion of themes introduced in Chap. 6, with an analysis of possible relationships between intuition and flow from a dual-process perspective. A conclusion of the chapter is that flow and intuition are related phenomena: flow could be seen as

intuitive action; intuition could be construed as cognition in flow. Finally, Chap. 8 discusses novel empirical work on flow and work engagement, a variable of obvious importance for achievement at work. The authors investigate whether the effects of perceived autonomy support are moderated by flow at work. In line with their hypotheses, the authors demonstrate that for individuals with higher flow at work, the relationships between autonomy, support and work engagement – as well as the satisfaction of certain intrinsic psychological needs – are weaker. Individuals with more flow at work are thus likely to show higher work engagement regardless of autonomy support.

In Part IV, we discuss flow in an educational context. Chapter 9 introduces a new tool for educators: a scale for measuring flow in education, based on a longitudinal study of flow experienced by students. The study underlines the importance and relevance of measuring flow in learning. *The EduFlow model: A Contribution Toward the Study of Optimal Learning Environments*. Chapter 10 presents an ESM study of flow during STEM (science, technology, engineering and math) education in lower secondary school, pointing to ways of solving the STEM crisis (i.e., too few students are interested in STEM subjects). The study contributes with new knowledge about factors necessary for increasing student motivation, engagement, learning and flow during STEM education. Chapter 11 presents studies that explore the connection between positive youth development, leisure and flow experience. Their results shed light on how a psycho-social-ecological approach can enhance positive youth development.

In Part V, we focus on investigating flow experience in everyday life. In order to explore this phenomenon, Chap. 12 begins by outlining a definition of consciousness before proceeding to explore subjective experience and the role of perceived challenges and skills in promoting growth in our ability to perform complex activities and improve our well-being. The Experience Sampling Method is presented as a method of collecting everyday experiences in real-time. The Experience Fluctuation Model is then introduced, which enables researchers to explore subjective perceptions of challenges and skills through analysis of real-time data. The empirical findings that support the model are discussed, providing insights into human experience in a variety of contexts and activities. Future research that could advance our knowledge of the phenomenology of conscious experience is suggested including how individuals move from one experience to another. In the following chapter (Chap. 13), reversal theory is introduced that provides a theoretical explanation for how people change between metamotivational states. It is argued that reversal theory and flow theory are compatible theories that together might enhance our understanding of optimal experiences in everyday life. An argument for the importance of phenomenology in the exploration of flow is presented; phenomenology itself is defined and the method considered. A reversal theory perspective of flow experiences in everyday life is given, which suggests that there are eight motivational states, each of which has a core feeling that a person will seek to optimise. The ways in which people may move between states are explained, including the importance protective frames and by reversals between metamotivational states. A justification is given for including reversal theory in future flow research.

In Part VI, we collected works from the field of social psychology. Chapter 14 presents a social psychological study of the connections between flow and the broader socio-cultural environment, thus pointing to the important role of flow experience, not just as an individual growth element but also as a resource for generating social change. Chapter 15 presents studies of team flow during work. The author introduces important new knowledge of components of team flow and point to ways of enhancing it. Chapter 16 presents studies of flow in human-technology interaction and introduces a new model of perfect interaction and knowledge of a new peculiar type of social flow that could be attained by creative groups.

In Part VII, we introduce research about flow and individual differences. A large amount of flow literature demonstrates that situational variables – e.g. environmental opportunities to engage in tasks, which are neither too challenging nor too simple – are important for flow. However, how much flow a person experiences also depends on certain individual variables. This is potentially of both theoretical and practical interest, since flow is related to many positive and valued outcomes. Chapter 17 summarises data from a large Swedish twin cohort, where associations between flow proneness and five basic modalities of individual differences were investigated, i.e. personality, cognitive abilities, motivation, emotional competence and performance on chronometric tasks. In line with flow theory and earlier literature, it was found that flow proneness is substantially related to personality, intrinsic motivation and emotional competence, but not to cognitive abilities or chronometric task performance. The possible importance of these findings for associations between flow, well-being and health is discussed. Chapter 18 focuses on how flow relates to one important outcome, namely personal identity strength, as conceptualised in eudaimonistic identity theory. The authors hypothesise that engaging in flow promoting activities can facilitate personal growth and self definition and find empirical support for this in a multinational investigation. Chapter 19, finally, takes a clinical perspective and discusses possible applications of flow in psychotherapy and mental health rehabilitation. The authors present results suggesting that finding flow may be an important component of psychotherapeutic intervention, by fostering positive change both inside and outside the therapeutic process, and by promoting the clients' integration and active involvement in society.

In last part (Part VIII) of this volume, authors discuss the physiological correlates of flow experience. In Chap. 20, the authors present new psychological and physiological research paradigms to assess and investigate the flow experience. They compare flow theory and research with concepts of challenge and threat as well as with mental effort. They go on to discuss applications for flow research and provide a critical review of existing studies that have aimed to investigate the psychological and physiological mechanisms of flow experience. Chapter 21 provides a condensed summary of findings obtained in research on the state of flow based on experimental paradigms and introduces studies that provide evidence documenting the specific nature of the state of flow – specifically regarding experiential and physiological processes. Chapter 22 proposes a neurobiological mechanism underlying reduced self-awareness during flow. From the perspective of occupational science, it focuses on capturing the last decade of brain imaging studies that analyze neural

systems for self-awareness, that show lower levels of activity during externally oriented task performance.

We hope that our anthology provides a thought-provoking overview of current flow research and that the suggestions for new directions will inspire researchers and practitioners within the field of psychology to continue to conduct experimental flow research that will lead to a better understanding of the psychological and physiological mechanisms underlying this fascinating and universally human experience.

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About the Editors

László Harmat, Ph.D. László Harmat was a postdoctoral research fellow at the Department of Neuroscience, Karolinska Institute in Fredrik Ulléns' group from 2011 to 2015. He is currently a researcher at the Department of Psychology, Uppsala University, Sweden. He completed his PhD in 2010 at Semmelweis University, Institute of Behavioral Sciences, Budapest, Hungary, and he was a lecturer in psychology at the same institution for several years. His main research interest involves exploring the physiological correlates of the flow experience and the therapeutic effects of music. He also investigates the neurophysiological underpinnings of expertise and skill learning. He is a graduated music teacher and has been leading a chamber choir in Stockholm, Sweden, since 2012.

Frans Ørsted Andersen has been Associate Professor at the Department of Education, Aarhus University, Denmark, since 2010. He is involved in school research at many levels and has conducted research within areas like motivation, engagement, cooperation, attention, learning and attention at both primary and secondary school levels, using flow as a concept and a theory to understand optimal learning environments. Teaching and learning in the STEM area (Science Technology Engineering and Math) is another area researched by Frans Ørsted Andersen. He also works with comparative Nordic educational research and has looked especially at the qualities of Finnish education. He has published several books and articles on flow, mainly in Danish and Norwegian, the latest book title being *Flow i hverdagen. Navigation mellem kaos, stress og kedsomhed* [Flow in everyday life. Navigation between chaos, stress and boredom] (2013).

Fredrik Ullén is Professor of Cognitive Neuroscience at the Department of Neuroscience, Karolinska Institutet, since 2010. An overall aim of his research is to analyse the neuropsychology of expert performance, i.e. the various brain mechanisms that allow us to perform at a very high level within a specific domain, after many years of training. One specific research interest is the flow experience, its underlying mechanisms and its importance for motivation and creativity in expertise. The research of Ullén is mainly focused on musicians as a model group. Methodologically, his team combines neuroimaging and behaviour genetic analyses with experimental psychology and physiology. In addition to his career as a scientist, Professor Ullén is active as a professional pianist and is represented as a soloist on around 20 CD records. He is a lifetime fellow of the Swedish Royal Academy of Music since 2007.

Jon Wright, Ph.D. Jon Wright is Principal Lecturer in the School of Health Sciences at the University of Brighton. He completed his PhD in 2008 exploring the process of optimal experiences utilising a phenomenological approach. Within his research Jon provides an occupational science perspective, a science that underpins his professional background as an occupational therapist. His research has integrated Reversal Theory to help our conceptualisation of flow. Jon's research continues to explore the flow concept, and with a team of Network Partners he is aiming to establish a shared conceptualisation of flow, developing guidelines regarding the utility of different measurements and indicators of flow.

Gaynor Sadlo, Ph.D., PgDTCDHE DipOccThy FCOT NTF Gaynor Sadlo recently retired as Professor of Occupational Science at the University of Brighton, England, following 47 years in occupational therapy practice, teaching and research. She has been interested in flow concepts for about 25 years, promoting undergraduate and postgraduate flow research (with colleague Dr Jon Wright) as crucial to the understanding of the therapeutic properties of 'occupation'; in particular, reduced self-awareness is seen as a crucial aspect of the beneficial effects of deep engagement. Flow within pedagogy is another major interest, and her pioneering research and practice in problem-based learning as a philosophy of optimal educational experience gained the award of National Teaching Fellow in 2007. She is a Fellow of the College of Occupational Therapists. She is currently also a visiting professor at the First Faculty of Medicine, Charles University, Prague, Czech Republic.

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Part I
Flow Experience: General Introduction

Chapter 1
Flow and Psychological Selection

Antonella Delle Fave and Marta Bassi

Abstract Flow or optimal experience is generally defined as a complex and positive state characterized by deep involvement and absorption, supporting personal growth, well-being and optimal functioning in daily life. Since its inception in the 1970s, great effort has been devoted to understand its phenomenological characteristics, antecedents and consequences, as well as its biological, cultural and psychological aspects. This chapter will provide an overview of the related findings, highlighting both the shared understanding of this experience and critical issues deserving further investigation. A specific interpretive framework will be adopted, that takes into account the active role played by individuals in shaping their life trajectories and personal development, though acknowledging the influences and constraints derived from the biological and cultural inheritance and environment. This process of psychological selection is based on personal meanings, goals and quality of subjective experience. Within this conceptual framework, flow contributes to the construction of personal identity, as well as to the co-construction of the individual's sociocultural context, through its influence on the long-term selection and replication of specific activities and information.

1.1 Introduction

The increasingly tangled ties that connect research domains and disciplines exploring human features and behavior represent one of the major problems science is facing today. Psychology is especially affected by this problem, in that it is positioned at the crossroads between biological and social sciences. Human mental processes and behaviors emerge from a multiplicity of events and influences coming from both biology and culture. It is therefore very difficult to investigate them as isolated

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phenomena, without taking into account the two broad inheritance systems to which they are inextricably related (Laland et al. 2000; Richerson and Boyd 2005).

The study of human experience is not exempt from this problem. Experience (*see* Chap. 12 *by Bassi and Delle Fave in this volume*) phenomenologically arises from the interaction of the individual with external or internal stimuli. These stimuli contribute to shaping the experience through both the information contents they carry at the cognitive level, and their qualitative impact at the emotional and motivational levels.

The positioning of individual behavior and experience in the point of intersection of the biological and cultural realms was acknowledged and formalized in the second half of last century by two different perspectives. Bio-cultural theories (Durham 1982; Richerson and Boyd 1978; Ruyle 1973) stressed the co-existence of two trans-generational inheritance systems – the biological and the cultural ones – that shaped human behavior and experience (Massimini and Delle Fave 2000). The bio-psycho-social model (Engel 1977) was developed in the domain of medicine with the aim of broadening the western biomedical approach to disease, prominently focused on the biological aspects of health conditions, by centering it on the patient as a person, with a cultural background and a subjective experience of health, disease, and quality of life (Levin and Browner 2005).

Besides their different disciplinary background and theoretical underpinnings, these two perspectives share a common view: Two sets of information influence human behavior. In particular, the capacity for culture provided humans with an extremely adaptive piece of equipment, allowing them to counterbalance biological constraints and weaknesses. Thanks to the ability to plan, formulate abstract theories, build mental representations of reality, and create basic survival artifacts, humans could survive in every kind of ecological niche (Delle Fave et al. 2011). The information derived by these two evolutionary systems is embodied in the subjective experience people associate to life events and daily activities.

However, by virtue of specific features and properties evolved by humans based on these two inheritance systems, the individual is not just a repository of biological and cultural information, and human experience does not consist in mere and passive elaboration of stimuli provided by the environment. Recent acquisitions in biology have highlighted that already very simple organisms with no centralized brain are able to perform active information processing and to produce goal-oriented behavior (e.g. the search for food in their natural environment) in order to restore homeostasis, defined as an attractor state towards which the system tends to proceed (Ginsburg and Jablonka 2010). With the subsequent emergence of more complex organisms, endowed with a central nervous system and a progressively higher potential for information storage and processing, the behavior of living systems was increasingly guided by associative learning, exemplified by classical and operant conditioning, that implied the ability to select among different possible behaviors according to the contingent situation, based on the systematic memorization of previous experiences and in view of specific adaptive goals (Carillo et al. 1997).

The early emergence in the history of animal evolution of individual agency and end-directed behaviors based on predictions derived from the memory of previous

experience was already described by William James (1890, volume I). A further step towards individual autonomy and agentic role was made possible by the specific human capacity for culture, that includes language development, artifacts' building and the production of symbolic information embedded in social customs, norms and values (Jablonka and Lamb 2014).

The crucial role of the individual as an active character in the interaction with the biological and cultural information has become an incontrovertible reality in light of the recent discoveries in the domain of epigenetics. The previously denied assumption, originally formulated by Lamarck, that genetic changes could be derived from behaviors and habits developed from the organism's active and adaptive interaction with the environment, was proved in prokaryotes and eukaryotes (Lachmann and Jablonka 1996). Some of the molecular and biochemical mechanisms underlying this process were clarified for mammalians, and their influence on behavior and psychological functioning of humans were recently evidenced (Zhang and Meaney 2010).

Epigenetic processes imply that through the interaction with the environment individuals may acquire features and assets that can become stable components of the organism's structure, and can be at least partially transmissible to the next generation. From this perspective, epigenetic mechanisms substantially enhance the plasticity and flexibility of individual behavior and functioning (Masterpasqua 2009).

These findings led scientists to represent the interaction between organisms and their environment in terms of a co-construction process; the role of individuals in this interactive process becomes progressively more relevant and active with the increase in species' complexity level. From this perspective, Lamarckian-like processes of inheritance are considered as "emergent phenomena" that are increasingly evident in more evolved species, due to the complex molecular mechanisms that allow for the integration of new material into the genome (Koonin and Wolf 2009). The individual experience and behavior represent the core elements of this co-construction process, and they substantially contribute to shaping both the individual development trajectory and the environmental features. This is especially true of the human species, whose impact on the ecosystem has been massive and to a certain extent even destructive (Diamond 2005; Mesoudi et al. 2006).

This view is also consistent with the conceptualization of living beings as Complex Adaptive Systems (CAS, Couture 2007; Holland 1998). CAS represent examples of dissipative structures (Nicolis and Prigogine 1989), in that the preservation and increase of their complexity require a ceaseless consumption of energy, partly transformed into activities and ordered structures, and partly dissipated due to collateral phenomena. A CAS is an integrated collection of highly differentiated components that dynamically and adaptively interact among each other and with the environment (Fromm 2004). Each of these specialized components contributes to the accomplishment of specific system functions, and it is connected with all the other components in a co-ordinated pattern that allows for the adaptive interaction of the system with the environment (Tononi and Edelman 1998). The higher the system adaptability, the higher is its resilience in presence of perturbations.

Miller (1970) summarized the features of complex systems by highlighting their statistical improbability and predictability: these systems derive from a teleonomic developmental process (Monod 1971), defined as the intrinsic project that shapes their structures, functions, and stable features, as well as their behavioral repertoire in the interaction with the environment. However, without a steady supply of energy from the environment, any complex system tends towards homogeneity, loss of specialization, and entropy, that in living entities can be assimilated to decay and death.

From a co-constructionist and teleonomic perspective, the process of individual development under physiological and adaptive conditions consists in a progressive increase of the system's complexity, by virtue of the ceaseless exchange of information with the environment that leads to more or less stable modifications at both the individual and environmental levels.

1.2 Psychological Selection

Within the evolutionary and co-constructionist perspective outlined in the previous section, the structure of individual behavior and experience throughout the life span emerges from the interaction with the biological and cultural environment. This interaction leads to a ceaseless and bidirectional exchange of information that promotes transformation at both the individual and the environmental levels (Pribram 1996). As concerns individuals, the acquisition of new information is transformed into stable neural connections at the biological level; and into personal skills, beliefs, meanings and purposes at the psychological level. However, the system configuration undergoes continuous changes, by virtue of the progressive integration of new information (Delle Fave 2007).

From the lifelong perspective, the moment-by-moment interaction of the individual with the environment results in the process of daily psychological selection (Csikszentmihalyi and Massimini 1985). This process unfolds from the selective use of attention, as a limited resource that compels individuals to focus on a restricted number of environmental or internal stimuli per time unit (Lavie 2005). Therefore, at each moment the individual effectively perceives only a small part of the available information, subsequently processing and organizing it for future use and transmission. In the long term, this constraint (or asset) leads to a selection trend that affects the biological, social/cultural and psychological features of the person (Delle Fave et al. 2011). To exemplify, at the biological level an individual can invest time and energy in prevention programs and fitness exercises, or on the opposite disregard physical health. At the social/cultural level, a person may decide to become a lawyer, a music teacher or a lab technician; to actively support a political party or union; to devote time to volunteering activities. In one word, each individual throughout his/her life differentially reproduces and transmit a subset of the information available in the environment, through the selective investment of limited attention resources on activities, political ideologies, moral and religious beliefs.

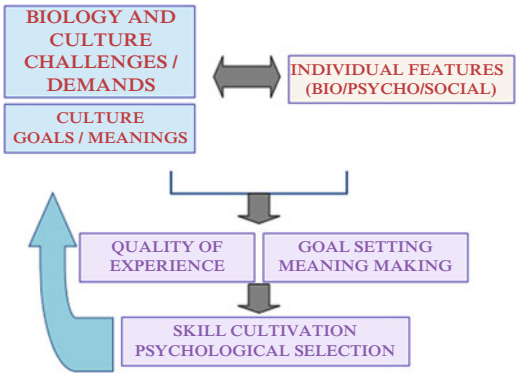

Fig. 1.1 Individual and bio-cultural environment: a dynamic interaction

Although psychological selection can be partially controlled and constrained by cultural features and rules (for example, social stratification based on social status or gender may restrict individual's access to specific information and domains of resource investment), in most societies each person is provided with a relatively wide range of behavioral and developmental alternatives. Overall, it is possible to affirm that individuals actively interact with the bio-cultural milieu, co-constructing it through their differential acquisition, elaboration and replication of environmental information (Delle Fave and Bassi 2014).

Several cross-cultural studies (summarized in Delle Fave et al. 2011) showed that two core elements play a key role in guiding psychological selection. The first one is the association of flow with at least some of activities available to the individual in the daily environment (Massimini et al. 1988). The second component is the perception of long-term meanings and purposes in daily opportunities for action (Delle Fave 2009). Meaning-making represents the way in which people organize their own experience in time around their values and beliefs through goal setting, definition of priorities and action strategies. Through the attribution of meaning to specific life activities and domains, individuals pursue goals deemed relevant, as well as consistent with social values and others' needs (Hicks and King 2009; Steger et al. 2008). Meaning-making is a dynamic process by definition, since individual values and priorities are not necessarily fixed entities: They are related to specific developmental tasks and stages, to the exposure and acquisition of new information, to the organization criteria individuals adopt to integrate the new information into their previous *Weltanschauung* (Delle Fave et al. 2013).

Thus, activities that are perceived as opportunities for engagement and flow, as well as aligned with relevant and meaningful goals, are more likely to be preferentially replicated and cultivated in the long term. Their selective cultivation provides the individual with increasingly complex competences and skills, fostering personal growth and development (Massimini and Delle Fave 2000). The dynamic interplay and ceaseless exchange of information between individuals and environment is summarized in Fig. 1.1.

1.3 Psychological Selection in Context: Biological and Cultural Influences

People differ in their tendency to perceive opportunities for optimal experiences in daily activities. Some people feel challenged by things that other people do not simply take into account as opportunities for action. This can be related to several individual and environmental factors, such as psychological traits and features, health conditions, characteristics of the ecosystem, social and cultural rules and habits, and the dynamic interplay among them. Some of these aspects will be explored in detail in the following paragraphs.

1.3.1 Health Conditions

Health conditions influence the opportunities for and the contents of optimal experiences, both in daily life and in the long term. Cross-cultural studies conducted among people with disabilities and chronic diseases have detected the impact of physical constraints on the access to activities and socialization contexts. After the onset of a chronic disease or disablement, individuals may be forced to identify new patterns of functioning in daily life, new goals and meanings, new life priorities. In some cases they have to dismiss previously gratifying activities and interests, and to look for different opportunities for optimal experiences, more suited to their actual capabilities and resources.

However, the pattern of daily experience fluctuation (*as described in* Chap. 12. *by Delle Fave and Bassi in this volume*) and the features and frequency of optimal experience reported by the participants in these studies are not influenced by physical conditions per se. On the contrary, research studies have emphasized the importance of optimal experience in supporting individual's physical and social functioning especially in conditions of chronic disease and disability. Across different cultural contexts, people with congenital disabilities such as blindness, ostheogenesis imperfecta or cerebral palsy reported optimal experiences and the pursuit of complex long-term goals that enabled them to effectively socialize and participate in active life (Cortinovis et al. 2011; Delle Fave 2010; Delle Fave and Massimini 2004).

As concerns diseases and disabilities acquired during adult life, a peculiar process was identified: the *transformation of optimal experience* (Delle Fave et al. 2011). Physical impairments can make activities previously associated with optimal experiences unavailable to the individual, who is thus forced to find other sources of intrinsic motivation, and engagement. Several studies showed that most persons with disabilities successfully manage to identify new opportunities for optimal experience, sometimes in areas very different from their previous interests (Delle Fave and Massimini 2005). Behavioral flexibility emerges as a crucial feature for adaptation to the environment, enabling the individual to pursue developmental goals despite biological constraints. This flexibility becomes evident soon after the disease onset. A

recent study conducted with experience sampling method among people hospitalized in a rehabilitation unit after orthopaedic surgery or stroke highlighted that participants prominently associated rehabilitation activities with optimal experience, clearly distinguishing it from personal care and leisure – the most frequent daily activities – in which they reported low challenging experiences of apathy and boredom instead (Sartori et al. 2014). This was true of both patients with severe impairment, and thus in a condition of complete dependence, and patients who were more autonomous. These findings suggest that the association of flow with rehabilitation tasks can help promote patients' awareness of their active role in recovery and in the cultivation of residual abilities, independent of their level of autonomy. It can also facilitate engagement in autonomous practice at home, where individuals are responsible for their own recovery and development of vicarious abilities, thus influencing well-being in the long run through the pursuit of health and autonomy-related goals.

These findings also challenge the assumptions of adaptation theory (Brickman and Campbell 1971), which states that within few weeks after a trauma individuals tend to psychologically adapt to the new condition: they report an increase in positive emotions and their average mood returns to the levels reported before trauma. Research findings, on the contrary, highlighted that individuals can actively search for new interests, meanings and life goals after the onset of a chronic disease, even identifying benefits in the illness condition (Sodergren and Hyland 2000; Tennen and Affleck 2002). Optimal experience plays a crucial role in this process, supporting resource investment, skill development, and personal growth (Bassi et al. 2014a; Delle Fave et al. 2015).

In line with this empirical evidence, an increasing amount of studies conducted within the perspective of positive psychology showed that the subjective perception of functioning in daily activities and situations affects the quality of life of people with chronic and degenerative disease besides and beyond physical conditions. These studies (synthetically summarized in Delle Fave 2013) highlight the pivotal role of psychological resources, strengths and potentials in promoting individuals' effective coping and adjustment to disease, and in contributing to well-being and flourishing.

These issues were addressed also within the domain of mental health. Mental disorders negatively impact on individual agency and perceived resourcefulness, thus undermining the evaluation and exploitation of opportunities for flow in daily life. Attention to psychological resources and promotion of positive experiences such as flow represent useful assets for psychotherapists, as reported in several studies (Bassi et al. 2012; Delle Fave and Massimini 1992; Lanfranchi et al. 2011) and by Riva, Bassi and Freire (*see* Chap. 19 *in this volume*).

1.3.2 Cultural and Social Features

Psychological selection seems to be a universally shared mechanism for the reproduction of environmental information, as well as for the creation of new information that can be shared with other individuals and ultimately integrated in the cultural

pool. Similarly, human behavior arises from motivations, emotions, and cognitive functions such as memory, learning strategies and abstract reasoning which are common psychic features of human beings. Every member of our species can accurately describe his/her feelings, thoughts, quality of experience in coping with daily activities and interactions. Similarly, every human being, as a complex adaptive system with an intrinsic tendency towards higher levels of complexity, pursues the acquisition of progressively increasing knowledge, competences and social integration across the life span.

This view, although conceptualized in different ways, is shared by non-western philosophical and cultural traditions (Morandi and Delle Fave 2013). Nevertheless, the meaning of complexity can astonishingly differ among cultural contexts. In western societies it is prominently related to the concept of self-actualization; it means to fulfil one's own desires, at the same time meeting culturally determined ethical and social expectations. However in other contexts, such as within Hinduism and Buddhism, it means attaining supreme detachment from desires and earthly goals.

Similarly, the importance attributed to personal feelings and expectations, individual autonomy and freedom of choice depends upon the cultural system in which people are raised and live; it is a product of the hierarchy of values that individuals develop during their life, according to ideal models acquired through the learning process. In particular, the emphasis on self-actualization and personal achievements specifically characterizes western cultures, in comparison with other societies. Western culture emphasizes personal initiative and resources in dealing with the environment, and the imperative of asserting one's own power and freedom in interpersonal relationships. In contrast, non-western collectivistic societies foster the adoption of indirect and collective control strategies, which entail the sharing of responsibility among individuals participating in the same task, and the preservation of harmony even in case of failure or negative outcomes (Delle Fave 2014). The so-called harmony control (Morling and Fiske 1999) leads individuals to recognize the agency residing in contextual, social, or spiritual forces rather than in their own person. By adopting this control strategy individuals attempt to merge with these forces instead of opposing them, thus accepting their own roles and their environment, without direct attempt to modify or change them.

The focus on the individual as the central unit of society led, for example, to the strong personalization of the artistic and scientific works in European history. Information about the identity and life history of the authors of philosophical theories, frescoes, poems and mathematical models is systematically documented and continuously implemented by new details discovered in archives. On the contrary, in several Asian societies the names of painters, sculptors, architects and scientists have never been recorded, although these individuals substantially contributed to the enrichment of human cultural heritage with their masterpieces and discoveries. The distinction between individualistic and collectivistic societies (Hofstede 1980; Hofstede et al. 2010) and between independent and interdependent self construals (Markus and Kitayama 1991) provide a solid framework in support of this evidence.

The relevance attached to the role of the individual by the cultural norms and values dominating in a society has deep consequences on psychological selection as

well, promoting the development of specific patterns of individual resource investment, goal setting and pursuit, meaning attribution and identification of opportunities for flow. In particular, the social structure and cultural constraints contribute to defining the range and variety of potential flow activities available to the person in the different life domains. The daily exposure of individuals to more or less challenging and complex environments influences the quality of experience associated with daily activities.

In the work domain, the enrolment in repetitive, low-challenge and merely executive tasks strongly limits the availability of occasions for optimal experiences (Delle Fave and Bassi 2014). In these conditions, optimal experiences can and must be found outside the work context, in leisure, family or social relations. Nevertheless, finding flow at work is particularly relevant from the perspective of psychological selection, since work activities occupy a conspicuous amount of daily time and life years; the possibility to identify in one's own job both an opportunity for flow and a source of goals and meaning represents a good prerequisite for global well-being promotion.

In modernized contexts, research recurrently highlighted some peculiar features of the flow experience associated with work activities, such as below average scores of affect and intrinsic reward, however counterbalanced by the perception of the short- and long-term relevance of the activity. This experiential profile was reported by a variety of professionals, prominently including office employees and factory workers. This phenomenon – not surprising, given the compulsory nature of work – was labeled the work paradox (Csikszentmihalyi and Lefevre 1989).

More recent studies conducted among teachers and physicians, however, showed a different picture, indicating the coexistence of autonomous and extrinsic regulation in the flow experience at work, and the need to more carefully consider this issue taking into account the typology of job under examination (Bassi and Delle Fave 2012a; Delle Fave and Massimini 2003). Results contradicting the flow paradox also emerged from a large study involving over 700 participants belonging to different western and non-western cultures (Delle Fave and Bassi 2016). The comparison of the experiential features of flow during traditional and modern job tasks highlighted that the former were characterized by higher values of affect (excitement, enjoyment, and relaxation), and a more autonomous pattern of behavioral regulation (wish to do the activity and effortless concentration). Traditional activities differ according to local ecosystem, customs and history, but they all share features of complexity and challenge that call into play the worker's dexterity, at the same time leading to tangible outcomes that represent either direct means of subsistence for the workers and their families, or useful and often long-lasting artifacts that convey a cultural meaning. In modern jobs, the standardization of behavior and of its products inevitably leads to restrictions in individual initiative and creativity, basic prerequisites for flow onset.

As concerns free time, it can provide occasions for pleasant relaxation and enjoyment through the performance of simple tasks; it can generate experiences of apathy due to the lack of perceived challenges, leading the individual to search for thrill in dangerous or antisocial activities. It can offer flow opportunities in challenging

activities that are however not meaningful in the long-term perspective of personal development. Finally, it can be used to practice so-called serious leisure activities (Stebbins 2007), that individuals can cultivate throughout their life as tools to expand their knowledge, increase their competences, and broaden their circle of relationships (Delle Fave and Bassi 2003). An exemplary case is represented by engagement in volunteering activities (Sartori and Delle Fave 2014).

The typology and variety of leisure activities offered to individuals partially depends on the cultural context and on the pattern of modernization vs. adherence to traditional lifestyle that characterizes a community. For example, in a study conducted among Rom gypsies living in the outskirts of an Italian city (Delle Fave et al. 2003a), the most frequent flow occasions reported by participants during free time were traditional Rom activities such as playing music, singing, dancing, and playing cards. They were cited as opportunities for flow across generations, even though younger participants could easily access modern leisure opportunities in the nearby town. In contrast, a generational gap was detected among the members of an extended family living in an Alpine valley in Northern Italy, who had been exposed to deep changes related to modernization and urbanization (Delle Fave and Massimini 1988). Elderly and middle aged participants primarily quoted traditional outdoor recreation, such as walking in nature, alpine skiing, dancing. By contrast, younger participants reported watching TV, ice-skating, reading, riding the bike, going to the disco. Some individuals – predominantly belonging to the middle generation – showed the adoption of an integration strategy, finding flow in both traditional and modernized occupations, such as playing the accordion and riding a motorbike (Delle Fave et al. 2011).

The influence of the cultural context in promoting or hindering access to optimal experiences has been also studied among immigrants. In particular, the adoption of the acculturation pattern of integration versus marginalization (Matsunaga et al. 2010; Tadmor et al. 2009), substantially impacts on opportunities for flow, as highlighted in a study with four groups of foreign citizens living in Italy (Delle Fave and Bassi 2009). In particular, irregular immigrant status, shorter length of residence in the host country and lower educational levels negatively affected individual chances to access complex and meaningful opportunities for flow. These participants relied on unstructured leisure tasks to find positive though low-challenge experiences, in the face of the hardship and stress reported in the other contexts of daily life. In contrast, participants showing a more functional acculturation patterns reported flow in a larger variety of daily activities. It is however worth noticing that in many cases the relevance of these tasks was not directly related to their intrinsic complexity, but to their connection with the person's long-term goals (for example, family reunion or financial support of children's education; Delle Fave et al. 2011).

Similarly, data gathered among people with physical disabilities highlighted that the environmental chances of social integration offered to them are often not matched with their own potentials, skills and resources (Cortinovis et al. 2011). While there is a growing effort to remove architectural barriers and to guarantee the accessibility of private and public places to all citizens, overcoming limitations related to sensory or mobility impairments, less visible communication barriers are

still present, including opportunities for jobs not suited to the person's education level, or social isolation, that can undermine both the quality of subjective experience and the social integration process of these people (Delle Fave and Massimini 2005).

Finally, especially in the early developmental stages the proximal environments of family and school have a strong influence on psychological selection and on the discovery and cultivation of optimal activities. The pattern of family interactions can facilitate or hamper the natural tendency of children to selectively engage in and replicate intrinsically rewarding activities. Children may derive positive examples and support in effectively face daily challenges from parents who are committed to self-determined goals (Rathunde 2001; Ryan and Deci 2000) and who perceive high levels of parental self-efficacy (Steca et al. 2011). A notion-centered school environment can lead children to the development of a passive and compulsory learning strategy; alternatively, a learning environment enabling students to find meaningful relations between study contents and personal experience and goals can help them discover the rewarding features of knowledge, and the potential of learning tasks as opportunities for optimal experience (Bassi and Delle Fave 2012b; Shernoff and Csikszentmihalyi 2009; Shernoff et al. 2003).

1.3.3 Psychological Characteristics

Specific talents and innate predispositions may influence the orientations of psychological selection and the perceived opportunities for optimal experience. Studies with talented teenagers (Csikszentmihalyi et al. 1993) have highlighted the relationship between talents in specific domains, such as music or mathematics, and the selective engagement in these domains as opportunities for optimal experiences and skill cultivation.

Talent can drive people, especially during childhood and adolescence, towards the spontaneous discovery of flow opportunities, as often happens with the practice of sports and arts. In these domains, activities originally practiced because of intrinsic enjoyment and reward for the attainment of positive results can become so meaningful and pervasive that they can turn into regular hobbies or occupations. In sports, this is the case of professional athletes, or amateurs who engage in risky sports requiring constant training (Delle Fave et al. 2003b; Jackson and Csikszentmihalyi 1999). In the artistic realm, music represents *par excellence* a domain that can provide remarkable opportunities for flow to talented amateurs and professionals, thanks to the virtually endless possibilities to enhance complexity and to develop innovations in both execution and composition tasks (Bakker 2005; Csikszentmihalyi 1988; MacDonald et al. 2006; Simoens and Tervaniemi 2013).

However, talent is not enough. Without commitment and deliberated effort, complex challenges cannot be faced in any activity domain. This issue emerged very clearly in findings collected among dancers (Massimini et al. 1988) and music students and professional musicians (Delle Fave et al. 2011; Massimini and Delle Fave