Doctoral thesis submitted to
the Faculty of Behavioural and Cultural Studies
Heidelberg University
in partial fulfillment of the requirements of the degree of
Doctor of Philosophy (Dr. phil.)
in Psychology

Title of the thesis

Developing Psychological Capital at Work: Comparing a Gamified Online Training with a Classroom Training Approach to Promote Employee Engagement in a Multinational Software Corporation

presented by
Maren Endres

year of submission
2021

Dean: Prof. Dr. Guido Sprenger
Advisors: Dr. Christine Hildesheim, Prof. Dr. Rainer M. Holm-Hadulla

Acknowledgements

I owe a debt of gratitude to all the people who have supported me in my research over the past years. Therefore, I would like to thank

Dr. Christine Hildesheim for her support, trust, and constructive feedback as my primary supervisor. I feel very fortunate to have been able to work with her on this project.

Prof. Dr. med. Rainer M. Holm-Hadulla for the initial idea and to act as my secondary supervisor. In addition, I greatly value his belief in my abilities, sound advice, and appreciation for my work.

Prof. Dr. Karlheinz Sonntag for his willingness to support my research project and the wonderful time at his Chair of Industrial and Organizational Psychology at the Psychological Institute of Heidelberg University.

Michael Dalgleish for his mentorship and trust. I have felt very supported by him.

Achim Seemann for his trust in me and my work as well as his positive attitude. He inspired me a lot.

all colleagues and participants who were involved in my research project. Without their active contribution and the support in the data collection, this dissertation would not have been possible.

all former colleagues at the Chair of Industrial and Organizational Psychology at the Psychological Institute of Heidelberg University for the professional and personal exchange as well as the great lunch breaks.

all friends who accompanied me on my dissertation and life journey for their social support, motivation, and valuable conversations.

my family, especially my mother Doris, who supported, encouraged, and believed in me not only during this dissertation but also in all other situations in life. I am deeply grateful for the loving support at all times, the everlasting trust in me, and the emotional support.

my husband Florian for his tireless encouragement, support at all times, and his love.

This dissertation is dedicated to all these great individuals.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ACS	Affective Commitment Scale
AI	Artificial Intelligence
ANCOVA	Analysis of covariance
APJ	Asia, Pacific, and Japan
AR	Augmented Reality
CCS	Continuance Commitment Scale
CEO	Chief Executive Officer
CG	Control group
CSE	Core self-evaluations
df	Degrees of freedom
EG	Experimental group
e.g.	For example
EMEA	Europe, Middle East, and Africa
HERO	Acronym for hope, self-efficacy, resilience, and optimism
HR	Human Resources
HRD	Human Resource Development
I-PCQ	Implicit Psychological Capital Questionnaire
JS	Job Satisfaction
JSS	Job Satisfaction Scale
LAC	Latin and Central America
LOT	Life Orientation Test
M	Mean
MEE	Middle and Eastern Europe
ML	Machine Learning
N	Sample size
NA	North America
NCS	Normative Commitment Scale
OB	Organizational Behavior
OC	Organizational Commitment
OCB	Organizational Citizenship Behavior
p	Significance level
PBL	Points, badges, leaderboard
PCI	Psychological Capital Intervention
PCQ	Psychological Capital Questionnaire
POB	Positive Organizational Behavior
POS	Positive Organizational Scholarship
PP	Positive Psychology
PRD	Personal Resource Development
PsyCap	Psychological Capital

r	Correlation coefficient
R^2	Variance explanation
ROI	Return on Investment
RS	Resilience Scale
SD	Standard deviation
SDT	Self-Determination Theory
T1	First measurement point
T2	Second measurement point
T3	Third measurement point
TCM	Three-Component Model
UWES	Utrecht Work Engagement Scale
UX	User experience
VR	Virtual Reality
XP	Experience point
WE	Work Engagement

Abstract

Background: Employee engagement is key to staying competitive in today's business environment. Nowadays, companies not only have to consider hard factors, like revenues and sales figures, but also soft factors like psychological capital (or PsyCap) if they want to stand out among the competition. PsyCap, an higher-order core-positive factor comprised of hope, self-efficacy, resilience, and optimism, is related to several positive outcomes in employee attitudes, behavior and performance (Avey, Luthans, Smith, & Palmer, 2010; Avey, Reichard, Luthans, & Mhatre, 2011). Various studies have come to the conclusion that the development of PsyCap leads to increased work performance and job satisfaction (Abbas, Raja, Darr, & Bouckenooghe, 2014), as well as psychological well-being (Avey, Luthans, Smith, & Palmer, 2010), and organizational commitment (Jensen & Luthans, 2006; NGUYEN & NGO, 2020). Empirical research confirms that PsyCap can be developed through short, highly focused group intervention (Luthans, Avey, Avolio, Norman, & Combs, 2006; Luthans, Avey, Avolio, & Peterson, 2010; Luthans, Avey, & Patera, 2008) and individual on-line sessions (Luthans et al., 2008). However, PsyCap training interventions have rarely been replicated using diverse settings with different populations and training facilitators that do not belong to the previous PsyCap instructors such as Luthans and colleagues (Dello Russo & Stoykova, 2015). To date, there are also no PsyCap interventions that involve innovative approaches like the inclusion of gamification techniques.

Objectives: This dissertation examines if PsyCap as a core construct can be developed in the workplace through two different training programs based on the four components of hope, self-efficacy, resilience, and optimism. In this context, it investigates how a gamified online training and several classroom trainings affect the PsyCap of individuals. More specifically, the present thesis focuses on the implementation and evaluation of an innovative gamified online training (study 1) and nine classroom trainings (study 2) to enhance the individual PsyCap of employees within the development organization of a multinational software corporation. The goals of the research study are threefold: (1) Comparing the two training methods (gamified online training and classroom training) in terms of effectiveness, (2) examining the longevity of the psychological capital interventions (PCI) using a two-month follow-up measure; and (3) comprehensively evaluating the PsyCap trainings.

Methods: The first empirical study examines the effectiveness of the PCI using an innovative gamified online training platform in which 57 participants took part. It uses a pretest, posttest control-group experimental design. The second empirical study tests the effectiveness of the PCI containing nine classroom trainings where 83 employees participated including an additional follow-up measure to determine the effectiveness of the PsyCap trainings over time. The investigation method of the studies consists of a quantitative online survey. Additionally, the relationships towards, and influence factor of PsyCap on work engagement, job satisfaction, and organizational commitment are assessed. Finally, both studies are compared to each other in terms of their method and results.

Results: The results of this dissertation show an increase in PsyCap in both training approaches. Nevertheless, no significant differences after the PsyCap training and over time compared to the control groups can be observed in the studies. In addition to the results, significant positive relationships exist between PsyCap and work engagement as well as between PsyCap and job satisfaction in both studies. There are no significant positive relationships between PsyCap and organizational commitment for study

1 and 2. Moreover, a significant proportion of work engagement and job satisfaction can be explained by PsyCap in both studies and at all measurement points. However, this is not valid for organizational commitment in study 1. Only a small percentage of the variance in organizational commitment is explained by PsyCap at T2 in study 2. Finally, the results of the post-training evaluation showed that the majority of the participants from study 1 and 2 would recommend the PsyCap training to a colleague or friend.

Conclusions: PsyCap has been regarded as a positive organizational behavior (POB) construct that is open for development and affects the functioning of employees and teams. It can achieve positive effects in an organizational context. The results of the studies indicate that employees' PsyCap can be increased through a gamified online and classroom training intervention in the workplace. Although the results did not show significant differences, they indicated a positive trend in both studies over time. Furthermore, the studies demonstrated the impact of PsyCap on important work-related variables such as job satisfaction and work engagement. Based on the results of the studies, approaches for future research as well as practice-oriented recommendations for human resource development in organizations and for the enhancement of PsyCap are presented. Limitations with regard to the lack of a second control group, the lack of randomization of the study participants to the study conditions, and the small sample size are also highlighted.

Keywords: Positive psychology, positive organizational behavior (POB), psychological capital (PsyCap), psychological capital intervention (PCI), gamification, classroom training, workplace

Introduction

We are what we repeatedly do. Excellence, then, is not an act, but a habit.
William James Durant, American philosopher

In an increasingly fast-paced world of work, characterized by growing competition, globalization, and an increasing complexity, traditional concepts for developing and managing human resources are reaching their limits. Companies can only remain competitive if they recognize and value people as their most valuable resource and develop their skills. The contributions of the field of psychology to well-being are recognized in a variety of areas including relationships, education, health, sports, the military, work, and life in general (Luthans & Youssef-Morgan, 2017). Over the past nearly two decades a new field of research in psychology has emerged: Positive psychology (PP). PP explicitly focuses on studying and understanding “normal” people’s well-being, productivity, optimal functioning, and realizing one’s full potential in contrast to “fixing” mental illness and dysfunctional behavior which used to be the primary focus in psychology since World War II (Seligman, Steen, Park, & Peterson, 2005). Inspired by Martin E. P. Seligman's research on positive psychology, two further concepts developed that aim to apply knowledge and principles to the workplace. The Movement of Positive Organizational Behavior (POB) as well as Positive Organizational Scholarship (POS). Positive Organizational Behavior is a comparatively young concept that applies the development and use of Psychological Capital (PsyCap) to the workplace (Luthans, 2002a). Inspired by positive psychology, Fred Luthans developed an approach that shifts the perspective from the dysfunctional to the functional of an organization. With this new and proactive approach, he wants to counteract organizational negativity. Among other things, Luthans’ aim is to better understand the "origin" of motivation, commitment, performance, and health. The goal is to better understand their origins from a psychological perspective and thus to be able to shape them. The term “capital” in the sense of origin refers on the one hand to the individual requirements on the employee and managerial side and on the other hand to their changeability and ultimately to the organizational framework conditions that are favorable for this (Luthans, Luthans, & Luthans, 2004). The changes that every sector faces in today's competitive world are also displayed in the classes of capital that give the organization competitive advantage (Cavus & Gokcen, 2014). These forms of capital, illustrated in Figure 0-1, are necessary for sustainable competition. However, they are not sufficient alone and should be considered together.

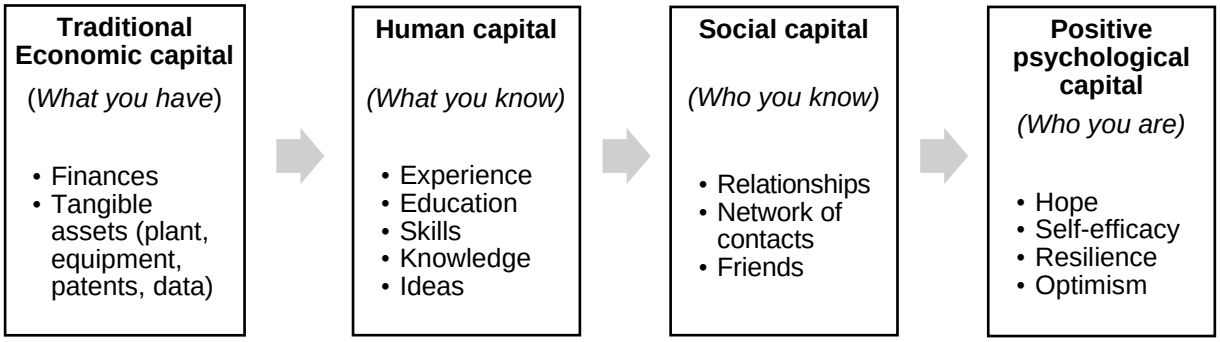


Figure 0-1. Different Types of Capital for Competitive Advantage adapted from Luthans, Luthans, and Luthans (2004, p. 46).

Traditional economic capital is about resources that are invested and used for future returns. Simply focusing on and acquiring more and more of the traditional resources (e.g., economic and financial capital, advanced technologies) has proven to be not enough for achieving sustainable competitive advantage (Luthans, Youssef, & Avolio, 2015). In general, human capital is the education, experience and intelligence (or put more simply the skills, knowledge, and ideas) of human beings. Coleman (1988) states that while human capital lays in every individual human being, social capital exists between people in their respective relationships. Social capital stands for "the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (Portes, 1998). It is about the value of relationships, friends, and the network of contacts (i.e., who you know). Luthans et al. (2015) suggest that PsyCap can complement other tangible (e.g., economic, financial) and intangible (e.g., human, social) forms of capital in order to build sustainable and people-based competitive advantage. PsyCap stands out from economic capital. It goes beyond human ('what you know') and social ('who you know') capital (Luthans, Avey et al., 2006). The HERO acronym (i.e., hope, self-efficacy, resilience, and optimism) is connected with 'who you are' and more essentially with 'who you are becoming' (Luthans, Avey et al., 2006). Furthermore, PsyCap can help address many of the most serious challenges of today and tomorrow, while motivating individuals, teams, and organizations to take advantage of the opportunities available (Luthans et al., 2015). Many managers and corporate consultants have noted that PsyCap can be a top-quality addition, or even replacement to their human resource development (HRD) and performance management models, and have even gone on to implement PsyCap interventions as an essential element of their consulting and management methods (Luthans et al., 2015). In addition, several studies have concluded that PsyCap development leads to higher job performance and job satisfaction (Abbas et al., 2014), psychological well-being (Avey, Luthans, Smith, & Palmer, 2010), as well as organizational commitment (Jensen & Luthans, 2006; NGUYEN & NGO, 2020). Furthermore, empirical research confirms that PsyCap can be developed through brief, highly focused group interventions (Luthans et al., 2008; Luthans, Avey et al., 2006) and individual online sessions (Luthans et al., 2008). However, PsyCap training interventions have rarely been replicated utilizing different settings, populations, and training facilitators other than the usual PsyCap trainers such as Luthans and colleagues (Dello Russo & Stoykova, 2015). Additionally, besides those PsyCap

intervention studies, there are no PsyCap interventions to date that incorporate innovative approaches such as gamification techniques into the training. Moreover, there is no study to date that examines and compares gamified online trainings and classroom trainings, which is particularly interesting in today's time with increasingly more demands and time pressure. This is where the present thesis comes in. The goal of the present research is to conduct two distinct PsyCap training programs based on the four elements of hope, self-efficacy, resilience, and optimism. The first study focuses on the implementation and evaluation of an innovative gamified online training *HERO of the Jungle* and the second study concentrates on the implementation and evaluation of nine classroom trainings, *Personal Resource Development*. The investigation of these two PsyCap enhancement approaches make an important scientific contribution to comparing the training methods in terms of effectiveness, examining the longevity of the psychological capital interventions (PCI) using a two-month follow-up measure, and comprehensively evaluating both PsyCap trainings. The following studies intend to establish PsyCap as a meaningful construct of organizational behavior (OB) and provide valuable insights for improving work-related functionality and employee engagement.

A brief overview of the structure of this dissertation is given next. In chapter 1, the literature on organizational positivity and gamification is described. Two positive organizational paradigms are introduced: Positive Organizational Scholarship (POS) and Positive Organizational Behavior (POB). The main construct of this thesis, psychological capital (PsyCap), is characterized before its individual elements hope, self-efficacy, resilience, and optimism are presented in more detail. Special attention is given to the measurement and development of PsyCap, including its impact on positive organizational outcomes. Furthermore, gamification is explained, as it plays a vital role in study 1. Chapter 2 describes the methods used to conduct the empirical studies. The study samples and research design are described as well as the study procedures. Lastly, the questionnaires used and the evaluation of the conducted studies are explained.

Chapter 3 presents the first PsyCap intervention study with the gamified online training *HERO of the Jungle*. At the beginning, a short introduction is given, followed by the presentation of the method including the gamified online training structure and the PsyCap development. Furthermore, the results are presented and finally discussed. Chapter 4 describes the second PsyCap intervention study with the classroom trainings *Personal Resource Development* including results and discussion. Finally, in chapter 5, the results of the two conducted studies are summarized in an overarching discussion. The strengths and limitations of the studies are discussed and suggestions for future research and practice are derived.

Through an intensive processing of the topic in the context of this dissertation, an awareness of positive psychological resources in the corporate context can be created. The practical relevance of this dissertation can be seen in the intensive consideration of psychological capital (PsyCap) as a current and highly significant topic in organizational practice.

Chapter 1 : Literature Review

This chapter provides a review of the literature on organizational positivity and gamification used as the basis for the studies reported in this thesis. To begin, an introduction is given (see chapter 1.1) followed by an overview of positivity in the workplace (see chapter 1.2). Two major positive organizational paradigms are described: Positive Organizational Scholarship (POS) and Positive Organizational Behavior (POB) (see chapter 1.3). Furthermore, the main construct of this thesis, psychological capital (PsyCap), is characterized before introducing the individual POB psychological capacities hope, self-efficacy, resilience, and optimism in more detail (see chapter 1.4). Special emphasis is placed on the measurement and development of PsyCap including its impact on positive organizational outcomes (see chapter 1.5). Afterwards, gamification is explained as it plays a crucial role in the first study (see chapter 1.6). The application and transferability of PsyCap to the workplace are emphasized by formulating the corresponding hypotheses that are incorporated in the studies of this thesis (see chapter 1.7).

1.1 Introduction

With advancing technology and digitalization in today's economy, the market for software producers and cloud providers is facing growing competition. Shorter development cycles and higher product complexity as well as the integration of these products place higher demands on developers (Hobday, 1998; Singh, Suar, & Leiter, 2012). The success of a company increasingly depends on employees to come up with innovative ideas, products, and services. Employee engagement and continuous further development are the driving forces behind a company's progress and success. In order to continue to achieve success, global corporations must ensure that they remain agile and innovative. Success is attained by 'thinking outside the box' and experience approaches which are strength-based (Luthans & Youssef, 2007). Enterprises must also rise to the challenge of training their worldwide staff and motivating them to continue their education so that they are able to cope with the challenges of the present and the future. But how can employees be motivated to voluntarily engage in further training opportunities in addition to their daily workload? Even if time made available to the workers for learning, it is not necessarily one of the tasks that the workforce likes to devote themselves to, nor one that claims top priority (Shelton & Darling, 2003). The consequences can be devastating for such corporations (e.g., attrition, unproductivity, demotivation). Companies that invest in their employees' skills are likely to retain them and keep them in the company. Improving skills also enables employees to be better integrated into the company's processes and provides greater motivation so that they can work more effectively.
Organizations that desire to survive and thrive in their respective industries need to incorporate learning as a fundamental competency (Namada, 2018). Especially in the fast-paced software industry, where the need to remain competitive is essential, companies need their employees to be up to date with both their own work and with emerging global trends. Through learning organizations can also react quickly and in a timely manner to changing environments (Namada, 2018). Employees who learn quickly through courses, refresher, and other further training initiatives can respond to the company's needs in a timely manner, both internally and externally (Namada, 2018). Companies have always been looking

for new ways to improve the efficiency and effectiveness of their employees' work and activate customers in order to stimulate cooperation and innovation.

Progressively, practitioners in a wide range of organizations - from healthcare to finance, retail, manufacturing, and nongovernmental organizations (NGOs) - are recognizing that positivity is a powerful aspect in improving people and organizational performance (Luthans et al., 2015). To remain competitive in a rapidly changing environment, dynamic capabilities that are primarily human-centric enable organizations to continuously integrate and leverage their resources rather than focusing only on more traditional resources (e.g., economic, financial) (Luthans et al., 2015). Therefore, what can best lead to a sustainable competitive advantage in response to environmental change lies in the dynamics of creating, acquiring, using, and reconfiguring resources in unique, idiosyncratic patterns (Barreto, 2010; Helfat & Peteraf, 2003; Teece, 2011). But what kind of dynamic and human-centric capabilities are there and how can they be acquired? How can a company ensure the further development of their employees? How can they instill a sense of lifelong learning and develop a positive mindset despite high workloads and time pressure? Luthans et al. (2015) propose a relatively new concept called Psychological Capital (PsyCap), which is a second-order core construct consisting of four, first-order components: Hope, self-efficacy, resilience, and optimism. PsyCap can help in mastering many of the most urgent challenges companies are facing at work by encouraging individuals, teams, and organizations to seize the opportunities that arise. Studies have shown that there is a link between PsyCap and desirable employee outcomes such as higher job satisfaction (Abbas et al., 2014; Luthans, Avolio, Avey, & Norman, 2007), organizational commitment (Jensen & Luthans, 2006; NGUYEN & NGO, 2020), job performance (Abbas et al., 2014), and psychological wellbeing (Avey, Luthans, Smith, & Palmer, 2010) in sectors such as banking, telecommunications, nursing, and textile manufacturing. Apparently, there are numerous positive outcomes from PsyCap and it seems worth promoting it. To fully understand the concept of PsyCap, a theoretical foundation is needed. The next section deals with the classification of positive psychology in the workplace before introducing two major positive organizational paradigms, Positive Organizational Scholarship (POS) and Positive Organizational Behavior (POB).

1.2. Positivity in the Workplace

Before positive psychology (PP) became established as a separate discipline within psychology, numerous researchers were already working on this topic. Representatives such as Carl Rogers or Abraham Maslow made important contributions to understanding positive aspects of human life, and thus created a central foundation for positive psychology (Ruch & Proyer, 2011). Already in 1954, Maslow (1908-1979) wanted to criticize the negative distortion of academic psychology by introducing the term "positive psychology" (Gallagher & Lopez, 2009). With the healing of mental illness, psychology was able to establish itself very successfully as a science and develop effective interventions, but this one-sided view led to certain topics not being dealt with or only being dealt with unilaterally (Auhagen, 2008). According to Holm-Hadulla (2020) “negative” psychology, recognizing conflicts, trauma, and disorders should be complemented by positive psychology when looking for creative solutions and the reinforcement of positive individual character traits and positive social activities improves the quality of

life and prevents pathological developments. Gable and Haidt (2005) define positive psychology as " […] the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (p.103). In short, it can be stated: „Positive psychology is the scientific study of what goes right in life" (Peterson, 2006, p.4). The goal of PP is „[…] to make people happier by understanding and building positive emotions" (Seligman, Parks, & Steen, 2004, p.1379). The resource-oriented focus of PP is by no means a new idea in psychology. It rather ties in with the idea of self-realization associated with humanistic psychology. It is not about replacing traditional psychology, but rather completing it. Nevertheless, there has been recent criticism that positively oriented approaches are merely a "rebranding" of already established organizational constructs and phenomena (Hackman, 2009). Specifically, it has been argued that extreme positivity in the workplace can lead to overconfidence, unrealistic optimism, and false hope among employees (Diener & Biswas-Diener, 2008). In turn, however, proponents have claimed that new positively oriented paradigms provide a modern platform for studying organizational behavior (OB) by integrating established literature with relatively new (to organizational research) positively oriented theories (Luthans & Avolio, 2009).

Positive Psychology is now widely recognized in the psychological field. There is a growing number of manuals and books dedicated to positive psychology (e.g. Aspinwall & Staudinger, 2003; Carr, 2011; Compton & Hoffman, 2019; David, Boniwell, & Ayers, 2013; Keyes & Haidt, 2002; Linley, Harrington, & Garcea, 2010; Linley & Joseph, 2004; Lopez & Snyder, 2003; Peterson, 2006; Peterson & Seligman, 2004; Sheldon, Kashdan, & Steger, 2010; Snyder, Lopez, & Pedrotti, 2011). Furthermore, there is a tremendous amount of practice-oriented bestsellers written by leading scientists in this field of research (e.g. Achor, 2011, 2013; Ben-Shahar, 2007; Diener & Biswas-Diener, 2008; Fredrickson, 2009, 2013; Lopez, 2013; Lyubomirsky, 2007, 2013; Seligman, 2002, 2011). Historically, there is a strong interest in positivity constructs in work and organizational psychology including a close connection to the humanistic psychology and motivational theories (Allport, 1955; Maslow, 1965, 1968), organizational change and development topics (Bennis, 1963, 1969), prosocial approaches such as Organizational Citizenship Behavior (OCB) (Batson, 1994; Organ, 1988), attention to job satisfaction (e.g. Smith, Kendall, & Hulin, 1969), and well-being at work (e.g. Warr, Cook, & Wall, 1979). However, very often profitability, economic efficiency (Ghoshal, 2005) and problem solving (Davis & Marquis, 2005) were the most important areas of interest in organizations. At the beginning of the 21st century the PP movement influenced the work and organizational psychology with topics around thriving (Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005), flourishing (Fredrickson & Losada, 2005), new paradigms like Positive Organizational Scholarship (Cameron & Caza, 2004; Cameron, Dutton, & Quinn, 2003) and Positive Organizational Behavior (Luthans, 2002a, 2002b), as well as well-being in the workplace (e.g. Day, Kelloway, & Hurrell Jr., 2014; Harter, Schmidt, & Hayes, 2002; Van Veldhoven & Peccei, 2014). Both POS and POB integrate positive psychology in the workplace. It is important to understand the differences between POS and POB in order to understand the impact and importance of PsyCap in the workplace. The following section goes into more detail about how these concepts are similar and the important ways in which they differ. Especially the differences are of importance when it comes to determining the construct validity of the core construct of this doctoral thesis; psychological capital (PsyCap).

1.3 Positive Organizational Scholarship and Positive Organizational Behavior

Organizational theory and behavioral scientists have recognized the untapped potential of a science-based positive approach that has resulted in two large parallel and complementary movements (Luthans et al., 2015). These are called positive organizational scholarship (POS, Cameron et al., 2003; Cameron & Spreitzer, 2012) and positive organizational behavior (POB, Luthans, 2002a, 2002b), which serves as a basic foundation for psychological capital. Positive organizational scholarship (POS) is a "movement in organizational science that focuses on the dynamics leading to exceptional individual and organizational performance such as developing human strengths, producing resilience and restoration, and fostering vitality" (Cameron & Caza, 2004, p.731). It is an overall concept that incorporates a wide range of domains and phenomena arising in organizational context like positive relationships, positive HR (Human Resource) practices, positive leadership, and change (Cameron & Spreitzer, 2012). The focus of POS lays on the macro-level of analysis meaning the organizational level itself (e.g. Bright, Cameron, & Caza, 2006; Cameron, Bright, & Caza, 2004). It contains positive characteristics, states, processes, dynamics, and results that are all relevant to organizations (Luthans & Youssef-Morgan, 2017). To understand what "Positive" means in the context of POS, there are four approaches to specify the domain more accurately. First, taking a unique lens or an alternative perspective, which means changing the interpretation of phenomena (e.g., obstacles are reinterpreted and seen as opportunities rather than problems) (Cameron & Spreitzer, 2012). Second, focusing on exceptionally positive outcomes or positive deviations, i.e., outcomes that drastically exceed usual or expected performance (Cameron & Spreitzer, 2012). Third, advocating an affirmative bias that encourages resourcefulness (Cameron & Spreitzer, 2012). POS is based on the premise that positivity unlocks the resources of individuals, groups, and organizations, so that capabilities are expanded and capacities are built and strengthened (Fredrickson, 2001, 2009). Regarding the third approach, POS adopts an affirmative bias, that prioritizes positive energy, positive, relationships, positive communication, and positive meaning in organizations (Cameron & Spreitzer, 2012). Finally, exploring virtuousness or the best of the human condition (Cameron & Spreitzer, 2012). POS is based on a eudaemonic assumption, which postulates that an inclination exists in all human systems toward achieving the highest aspirations of humankind (Cameron & Spreitzer, 2012). These four approaches do not *define* the term "positive" as such, however, they do identify the domain that POS scholars are trying to address (Cameron & Spreitzer, 2012). The "O", organizational, with regards to POS emphases the investigation of positive processes and conditions that occur in connection with organizational contexts. Furthermore, it analyzes positive phenomena within and between organizations, as well as the positive organizational context itself (Cameron & Spreitzer, 2012). The "S", scholarship, in terms of POS focuses on pursuing strict, systematic, and theory-based foundations for positive phenomena. POS requires careful definition of terms, consistency with scientific procedures when drawing conclusions, a theoretical justification, and a solid foundation in previous scientific work (Cameron & Spreitzer, 2012).

Besides that, to bring positive psychology to the workplace Luthans (2002a, 2002b) introduced the term positive organizational behavior (POB). Luthans (2002a) defines POB as „the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today's workplace“ (p. 59). The motivation for initiating positive organizational behavior was to address the underrepresented positive perspective, approach, and constructs in organizational literature (Luthans, 2002a, 2002b). POB accentuates constructs that can aid the prediction, explanation, and development of positive attitudes, behaviors, and performance outcomes (Avey et al., 2011). POS and POB have common roots in positive psychology concerning their approach to organizational behavior and functioning. In many ways the two paradigms are parallel and complementary (Youssef & Luthans, 2011). POS and POB have been used interchangeably in the literature (e.g. Hackman, 2009). However, each paradigm has its own meaning and areas of research. Figure 1-1 illustrates the distinctive characteristics including core concepts of POS and POB.

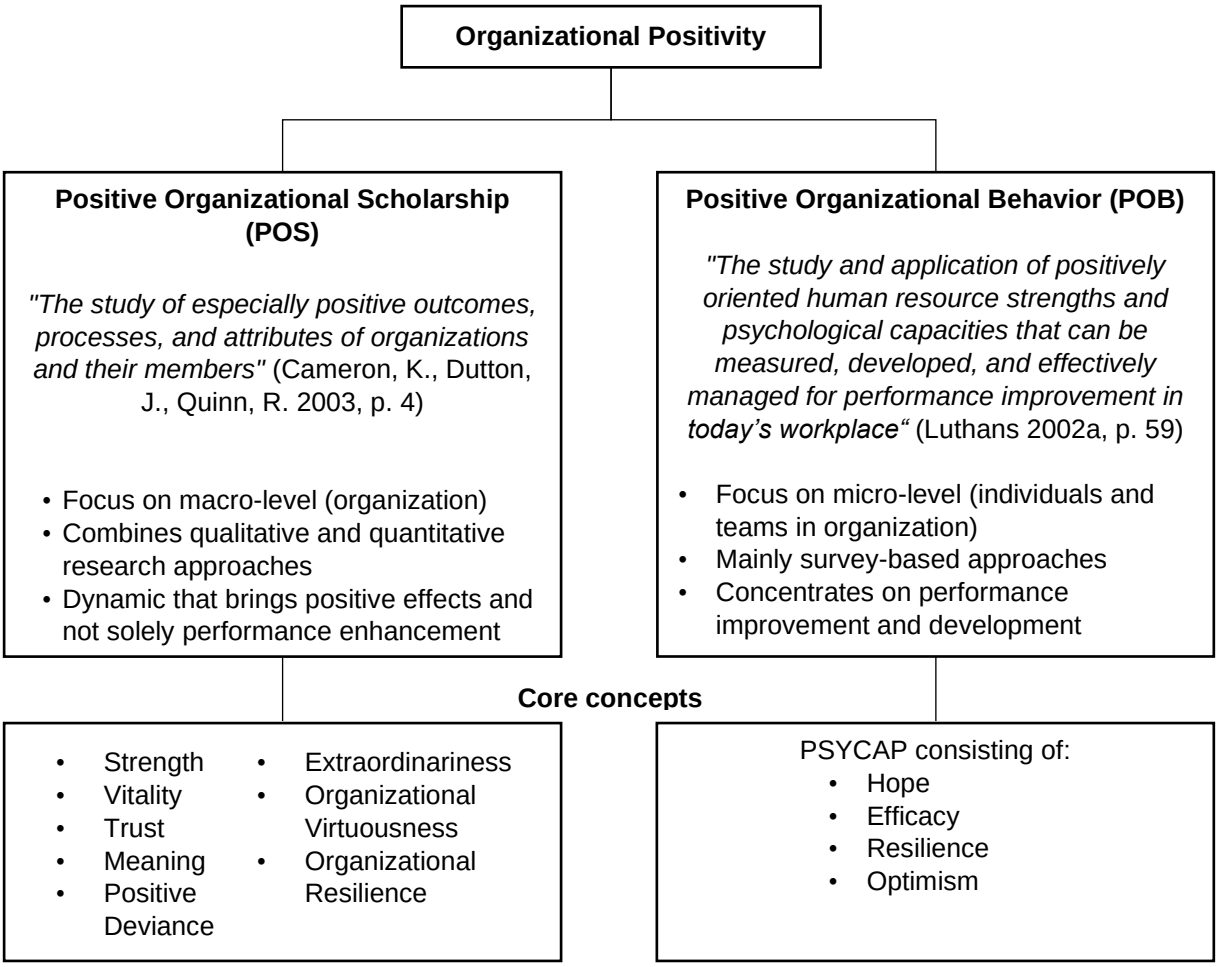


Figure 1-1. Distinctive Characteristics and Core Concepts of Positive Organizational Scholarship and Positive Organizational Behavior based on Discussions by Donaldson and Ko (2010) and Youssef and Luthans (2011).

Whereas POS is associated with the macro-level (i.e., organization itself), Luthans and Youssef (2007) declare that POB is concentrating on the micro-level (i.e., the individuals) in the organization. To put it clearly, individual employee performance and performance increase is less important for POS as it deals more directly with the positive aspects of the organizational context. Hence, core concepts of POS contain vitality, positive deviance, and organizational virtuousness (Cameron, 2003; Spreitzer & Sonenshein, 2004). These concepts focus less on development and employee performance in contrast to POB. In addition, POB has begun to also involve teams or groups of people (e.g. Clapp-Smith, Vogelgesang, & Avey, 2009; Walumbwa, Luthans, Avey, & Oke, 2011) and organizational (Avey, Wernsing, & Luthans, 2008) levels of analysis. Both approaches differ in terms of their primary research methods. So far, POB research has mostly been carried out on an individual level of analysis and only survey-based methods have been implemented. In contrast, POS mainly focuses on the organizational level of analysis, using both quantitative and qualitative research methods (Donaldson & Ko, 2010).
To conclude, POS and POB have a common understanding of being evidence-based, situated in the workplace, and focused on scientific methods. Nevertheless, they can be distinguished in terms of their core concepts, primary research methods, and emphasis on employee performance and performance enhancement.

To differentiate POB from POS and other positive approaches described in the academic literature, the following requirements were determined for embedding constructs in the definition of POB: (a) grounded in theory and research; (b) valid measurement, (c) relatively unique to the field of organizational behavior; (d) state-like and therefore open to development and change in contrast to a fixed trait; and (e) have a positive impact on work-related individual-level performance and satisfaction (Luthans, 2002a, 2002b; Luthans, Youssef, & Avolio, 2007b). Therefore, from the perspective of POB, a positive construct should be developmental and ‘state-like’. Luthans and Youssef (2007) explain the formability of POB constructs using a trait-state continuum.

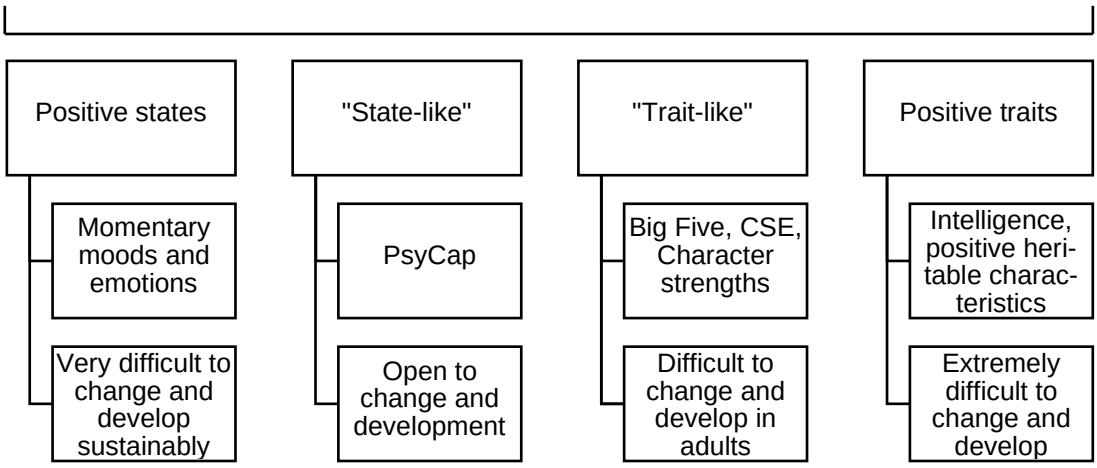


Figure 1-2. The Trait-State Continuum of PsyCap Change and Development adopted from Luthans et al. (2015, p. 25).

As described in Figure 1-2, on one side of the continuum there are pure states. They comprise momentary, highly variable states like moods and emotions. States are very difficult to change and to develop sustainably. State-like characteristics such as PsyCap are formable and open to change and development. Trait-like resources are relatively stable over time and difficult to change and develop such as the Big Five personality traits of extroversion, agreeableness, conscientiousness, neuroticism, and openness (Barrick & Mount, 1991), Core self- evaluations (CSE; i.e., self-esteem, generalized self-efficacy, locus of control, and emotional stability) (Judge & Bono, 2001), and character strengths (e.g., curiosity, bravery, kindness, fairness, and gratitude) (Peterson & Seligman, 2004). Finally, at the other extreme of the continuum there are pure traits. They are stable and very difficult to change and to develop (e.g., intelligence and heritable characteristics). According to Luthans, Youssef, and Avolio (2007c), the four capacities that best fit the POB inclusion criteria as mentioned above are hope, self-efficacy, resilience, and optimism and the higher-order core construct of PsyCap comprised of these four positive psychological elements. In the next chapter the four PsyCap elements are described individually before investigating the measurement and development of PsyCap in the workplace.

1.4. Psychological Capital in the Context of POB

Based on the POB definition described in the previous chapter, positive psychological capacities are measurable, open for development, and can be managed for more effective performance at work (Luthans, 2002a, 2002b). Since the introduction of the POB criteria described above, several positive psychological resources have been explored both conceptually and empirically for the inclusion in the POB framework (Dawkins & Martin, 2010). To date, those deemed to best fit the POB inclusion criteria are hope, self-efficacy, resilience, and optimism (Luthans, Youssef, & Avolio, 2007c). Each of these positive psychological capabilities has been studied individually for their POB potential (Luthans, Youssef, & Avolio, 2007c). Confirmatory factor analysis have consistently shown that there is an underlying core factor, with the common variance between facets comprising the higher order factor, PsyCap (Luthans, Youssef, & Avolio, 2007c). Other positive constructs that may have similar relevance and potential for inclusion in PsyCap now and in the future are creativity, flow, mindfulness, gratitude, forgiveness, emotional intelligence, authenticity or courage (Luthans et al., 2015). However, they differ in meeting the required POB inclusion criteria of being theory based, measurable, state-like or developable, and associated with performance impact and other desirable work-related outcomes (Luthans et al., 2015). Furthermore, there are two additional underlying theoretical mechanisms for a construct to be included in psychological capital. These mechanisms are: 1) An internalized sense of agency, control, and intentionality (Youssef-Morgan & Luthans, 2013), and 2) “Positive appraisal of circumstances and profitability for success based on motivated effort and perseverance” (Luthans, Avolio et al., 2007, p. 550). These two additional theoretical criteria offer both support and potential limits to these potential positive constructs for inclusion in PsyCap (Luthans et al., 2015). The positive psychological resources of PsyCap (hope, self-efficacy, resilience, and optimism) are well recognized in positive psychology and clinical psychology. However, they have been poorly represented in organizational behavior (OB) research (Luthans, 2012). Putting together the four psychological capacities synergistically, they form a core construct called “Psychological Capital” or simply PsyCap.

The formal definition of PsyCap is “an individual’s positive psychological state of development that is characterized by (a) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (b) making a positive attribution (optimism) about succeeding now and in the future; (c) persevering toward goals, and when necessary, redirecting paths to goals (hope) in order to succeed; and (d) when beset by problems and adversity, sustaining and bouncing back and even beyond (resilience) to attain success” (Luthans, Youssef, & Avolio, p. 3). The theoretical depiction of PsyCap can be drawn from Fredrickson’s (2001, 2009) broaden-and-build theory of positive emotions. Accordingly, positive emotions expand (broaden) one’s own thinking, which leads to the development of lasting personal resources. Furthermore, PsyCap can also be derived by psychological resource theories (e.g. see Hobfoll, 2002). These widely accepted theories stress the need to treat individual resources (e.g., the POB capacities) not in isolation but as manifestations of an underlying core construct or integrated set of resources (in this case PsyCap) (Luthans, Youssef, & Avolio, 2007c). Key resource theories (e.g. Thoits, 1994), for instance, have identified resources at the individual level such as self-efficacy, optimism, resilience, and the amount of goal pursuit (a fundamental part of hope) as essential basic resources for managing and adapting other resources to gain favorable outcomes.

PsyCap Outcomes

A meta-analysis from Avey et al. (2011) combined previous research on PsyCap and discovered that PsyCap was strongly related to desired employee attitudes, behaviors, and performance. In a review by Newman, Ucbasaran, Zhu, and Hirst (2014), the authors indicated that PsyCap was also related to employee creativity (Huang & Luthans, 2014; Rego, Sousa, Marques, & Pina e Cunha, 2012; Sweetman, D., Luthans, F., Avey, J. B., & Luthans, B. C., 2011), problem solving and innovation (Luthans, Youssef, & Rawski, 2011), and well-being (Avey, Luthans, Smith, & Palmer, 2010; Baron, Franklin, & Hmieleski, 2013; Culbertson, Fullagar, & Mills, 2010; Luthans, Youssef, Sweetman, & Harms, 2013; Roche, Haar, & Luthans, 2014). In addition, recent research has shown that PsyCap also has a positive effect at the collective level on service quality, customer satisfaction, and unit revenues (Mathe, Scott-Halsell, Kim, & Krawczyk, 2017) and at the individual level on work-family conflict (Karatepe & Karadas, 2014; Wang, Liu, Wang, & Wang, 2012). Furthermore, PsyCap is positively related to extra-role organizational citizenship behavior (OCB) (Avey, Luthans, & Youssef, 2010). OCB can be defined as “individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization” (Organ, 1988). OCB dimensions include altruism, conscientiousness, civic virtue, sportsmanship, and courtesy (Brief & Motowidlo, 1986; Podsakoff, MacKenzie, Moorman, & Fetter, 1990). Altruistic behavior is supposed to help another person. Such behavior includes assisting an employee with a task or project, standing in for an employee during their absence, and similar behaviors aimed at helping an employee that are not officially recognized as part of the employees’ recognized duties (Norman, Avey, Nimnicht, & Graber Pigeon, 2010). According to Norman, Avey et al. (2010) people with high levels of PsyCap seem to show more OCB than those with lower levels of PsyCap. In addition, OCB can be linked to work engagement through organizational commitment (Babcock-Roberson & Strickland, 2010). Recent

empirical studies support the interaction between positive personality traits and states at the individual level in predicting the frequency and consistency of applying OCBs (Ilies, Scott, & Judge, 2006).

PsyCap Components

As outlined in Figure 1-3, PsyCap is characterized as a higher-order core construct comprised of the four positive psychological capacities hope ("persevering towards goals and, when necessary, redirecting paths to goals in order to succeed"), self-efficacy ("having confidence to take on and put in the necessary effort to succeed at challenging tasks"), resilience ("when beset by problems and adversity, sustaining and bouncing back and even beyond to achieve success"), and optimism ("making positive attributions about succeeding now and in the future") (Luthans et al., 2015, 2007c, p. 3).

PsyCap *"An individual's positive psychological state of development that is characterized by hope, self-efficacy, resilience and optimism"*			
Hope	**Self-efficacy**	**Resilience**	**Optimism**
"Persevering towards goals and, when necessary, redirecting paths to goals in order to succeed"	*"Having confidence to take on and put in the necessary effort to succeed at challenging tasks"*	*"When beset by problems and adversity, sustaining and bouncing back and even beyond to achieve success"*	*"Making positive attributions about succeeding now and in the future"*
• Future-oriented • Associated with will-power and way-power to reach goals	• Present and future-oriented • Associated with thrive on challenges and invest necessary efforts to reach goals	• Past and present-oriented • Associated with recovery from adverse events to maintain the status quo	• Future-oriented • Associated with buffer between the effects of negative events and expectations for the future • Amplifies the positive effects of favorable events

Figure 1-3. Overview of Individual PsyCap Elements and their Contribution to the Overall PsyCap adapted from Luthans, Youssef, and Avolio (2007c)**.**

The four PsyCap elements have different characteristics in terms of temporal directedness and respective focus. Hope is future-oriented and associated with will-power and way-power to reach the desired goals. Self-efficacy is present and future-oriented and related to succeed in challenges and invest the necessary efforts to attain the anticipated goals. Resilience is past and present-oriented and linked to bouncing back from adverse events to maintain the status quo. Optimism is future-oriented and associated with a buffer between the effects of negative events and expectations for the future. In addition, optimism amplifies the positive effects of favorable events.

In this section, a closer look at the individual PsyCap components is worthwhile to gain a profounder understanding of the higher-order core constructs. In addition, it is reported which outcome the individual PsyCap elements have and how they are addressed in the PsyCap trainings.

Hope. Hope is defined as "a positive motivational state based on an interactively derived sense of successful (a) agency (goal-directed energy) and (b) pathways (planning to meet goals)" (Snyder, Irving, & Anderson, 1991, p. 287). Based on this definition, hope consists of two important elements: agency, as the willpower to strive for goals, and pathways, the "waypower" to find new and alternative paths to attain goals when goal blockages emerge. Agentic thinking demonstrates self-referring thoughts about both beginning a pathway and the continuation of a path (Snyder, Rand, & Sigmon, 2002b). People with high levels of hope use self-talk agentic statements such as "I can do this" or "I am not going to be stopped" (Snyder, LaPointe, Crowson, & Early, 1998). Agency helps people to apply the necessary motivation to go the best alternative path when impediments occur (Snyder, 1994b). Referring to the 'waypower' aspect of hope, people are able to generate different paths in order to reach their goal even when it seems to become blocked (Snyder, 1994a, 1995; Snyder, Ilardi, Michael, & Cheavens, 2000; Snyder, Rand, & Sigmon, 2002a). With regard to that, hope is future-oriented. It is positively related to job performance (e.g. Adams et al., 2003; Luthans, van Wyk, & Walumbwa, 2004), job satisfaction (Law & Guo, 2016), organizational commitment, and work happiness (Youssef & Luthans, 2007). Besides that, in their study Othman and Nasurdin (2011) found that hope is a predictor of work engagement. PsyCap interventions on the hope component contain goal-setting exercises, including goal stretching (setting challenging goals that are slightly outside the current range), stepping (graduated mastery), and re-goaling to avoid false hope (Snyder, 2000). In sum, hope theory focuses on attaining desired and personally valuable goals emphasizing the agency and pathway component of the positive psychological construct of hope.

Self-efficacy. Self-efficacy is defined as "the individual's conviction or confidence about his or her abilities to mobilize the motivation, cognitive resources, or courses of action needed to successfully execute a specific task within a given context" (Stajkovic & Luthans, 1998b, p. 66). Self-efficacy, or simply confidence, was originally founded by Bandura's (1986, 1997) social cognitive theory. It has been studied comprehensively in psychology research, as well as in Organizational Behavior (OB) and Human Resource Management (HRM). Self-efficacy is not related to what I think I will do but what I think I can do (Maddux, 2009). A self-efficacy belief is the belief that a person can perform the behavior that produces the result (Maddux, 2009). Bandura (1997) uses the term "confidence" sporadically and most efficacy theorists use it conceptually as a sub-form of efficacy. However, self-efficacy and confidence are often used interchangeably in Positive Psychology (e.g. Maddux, 2009). In the more applied fields of organizational performance and sports "confidence" is more commonly used (e.g. Kanter, 2004). In this dissertation, the terms efficacy and confidence are summarized under the term self-efficacy. People with high levels of self-efficacy welcome new challenges and invest high efforts to accomplish their goals. Subsequently, self-efficacious individuals own five components:

a. “They set high goals for themselves and self-select into difficult tasks.
b. They welcome and thrive on challenge.
c. They are highly self-motivated.
d. They invest the necessary effort to accomplish their goals.
e. When faced with obstacles, they persevere.” (Luthans et al., 2015, p. 51).

Self-efficacy is positively related to job performance (Stajkovic & Luthans, 2003), job satisfaction (Law & Guo, 2016), work engagement (Salanova, Lorente, Chambel, & Martínez, 2011), organizational commitment (Law & Guo, 2016) and well-being (De Caroli & Sagone, 2014), and negatively associated with turnover intentions (Harris & Cameron, 2005) and occupational stress (Matsui & Onglatco, 1992). PsyCap interventions on the self-efficacy component consist of experiencing mastery, vicarious learning, and positive feedback (e.g. Bandura, 1977; Luthans, Luthans, & Luthans, 2004; Stajkovic & Luthans, 1998a, 1998b). In sum, self-efficacy focuses on people’s confidence in their abilities to reach a personal, valuable goal in a specific situation.

Resilience. Resilience is defined as “the capacity to rebound or bounce back from adversity, conflict, failure or even positive events, progress, and increased responsibility” (Luthans, 2002a, p.72). By using personal, social, or psychological resources resilience embodies the application of positive adjustment patterns and processes to overcome adversity or risk factors (Masten, Cutuli, Herbers, & Gabrielle-Reed, 2009). Furthermore, it stands for the use of positive adaptation patterns and processes to overcome adversity or risk factors by exploiting personal, social, or psychological advantages (Masten et al., 2009). Equivalently, Caza and Milton (2012) specify resilience at work as “a developmental trajectory characterized by demonstrated competence in the face of, and professional growth after, experiences of adversity in the workplace” (p. 896). Both definitions of resilience have some aspects in common: a) Existence of adversity, b) outlined adaption, and c) ensuing growth. According to Coutu (2002) resilient people accept the hard realities, find meaning in horrible times, and they have an astonishing ability to improvise and cope with anything that comes their way. Following the work of positive psychologist Ann Masten (2001), PsyCap resilience focuses on the proactive assessment of risks and personal assets that affect employee outcomes. Risk is defined as “an elevated probability of an undesirable outcome” (Masten & Reed, 2002, p. 76). Transferred to the workplace, risks can encompass external threats such as economic instability (macro level) or internal threats such as harassment, or missing a career-threatening appointment on a project (micro level) (Luthans, Vogelgesang, & Lester, 2006). As each person has their own preference for risk tolerance, what might be perceived as risky to one might not be risky to another. Besides that, an asset is defined as “a measurable characteristic in a group of individuals or their situation that predicts positive outcome in the future on a specific outcome criterion (Masten & Reed, 2002, p. 76).” Oftentimes resource is used as a synonym for asset, implying the human, social, or material capital used in adaptive processes. Pure personal assets in the workplace can be promotions, bonuses, recognitions or mentorship programs (Masten & Reed, 2002). Luthans, Vogelgesang, and Lester (2006) propose that these risks and assets are an enlargement of human and social capital. Thus, by enhancing an employee’s access to knowledge, skills, or abilities, or by enlarging the social network, risks are decreased and personal

assets are increased. Besides, resilience is past and present-oriented. Furthermore, resilience is positively linked to job performance (Luthans, Avolio, Walumbwa, & Li, 2005), job satisfaction (Luthans & Youssef, 2007) and organizational commitment (Luthans & Youssef, 2007). Resilient employees have positive self-perceptions, emotional stability, self-regulation, cognitive abilities, and sense of humor. They are independent, creative, moral, and have positive relationships. PsyCap interventions on the resilience component cover assessing personal resources and risks in specific situations as well as generating multiple pathways for goal achievement. It is theorized that the latter increases participants' resilience as it enables them to 'bounce back' should an original pathway be blocked or met with challenges (Luthans et al., 2010). In sum, resilience is a dynamic process of positive adaption to adverse or strong positive conditions, and, relevant to Human Resource Development (HRD), is state-like and open to development.

Optimism. Optimism is presented in positive psychology as both a positive expectation of the future and open to development (Carver & Scheier, 2002) and an attributive (i.e., explanatory) style. Concerning the latter, negative events are interpreted as external, temporary, and situation specific, whereas positive events are interpreted as personal, permanent, and pervasive (Seligman, 2006). According to Carver and Scheier (2002) „optimists are people who expect good things to happen to them; pessimists are people who expect bad things to happen to them (p. 231)." Even though optimism has been described as dispositional in the initial work of Scheier and Carver (1985), Seligman (2006) later proposed that it can be enhanced, which he named "learned optimism". In fact, in support of Seligman's arguments, Carver and Scheier (2002, p. 240) have recently found that developmental interventions allow "a change in an optimistic direction". Although people may be more or less optimistic, there is potential to develop optimism, which contributes to the theory-based support for being state-like and able to develop through intervention (Luthans et al., 2010). When optimists encounter difficulties, they keep trying to find a solution for their issue, which is partly related to the waypower component of hope. Snyder (2002, p, 257) mentions that similar to hope "optimism is a goal-based cognitive process that operates whenever an outcome is perceived as having substantial value." Therefore, optimism is future-oriented just like hope. Besides that, optimism is positively associated with many desirable outcomes such as workplace performance (Avey et al., 2011; Seligman, 1998, 2006) and job satisfaction (Youssef & Luthans, 2007), and individuals with high levels of optimism have positive attributions to success, which acts as a buffer against the effects of job tension (Totterdell, Wood, & Wall, 2006). In addition, optimism has been found to be a crucial moderating factor in the relationship between job characteristics and job strain where optimistic employees are less likely to experience symptoms of workplace stress (Totterdell et al., 2006). PsyCap interventions on the optimism component comprise changing a pessimistic explanatory style or cultivating an optimistic explanatory style. Schneider's (2001) three-step process involving 1) leniency for the past; 2) appreciation for the present; and 3) opportunity seeking for the future is particularly relevant to the development of PsyCap optimism. Following this process, individuals must be able to carefully evaluate the impact of negative feelings associated with past experiences or situations on their ability to appreciate and learn from the positive aspects of the situation and inhibit future (calculated) risk taking (Schneider, 2001). In sum, PsyCap optimism is considered both a positive expectation of the future and an attributional explanatory style.

Interconnectedness of the PsyCap components. What the four positive psychological capacities have in common is their joint sense of control, intentionality, and agentic pursuit of goals (Luthans & Youssef-Morgan, 2017). Additionally, they share the same idea of "positive appraisal of circumstances and probability for success based on motivated effort and perseverance" (Luthans, Avolio et al., 2007, p. 550). For example, people with a high degree of optimism will rate their chances of success as high. Individuals with self-efficacy will set themselves challenging goals and make every effort to achieve them. Hopeful people will generate multiple pathways to reach their goals and find additional ways to their goals when pathways are blocked. People with a high sense of resilience will bounce back from setbacks or obstacles with competent functioning to reach their goals. As the goals are pursued and achieved, these HERO resources together will help keep an internalized sense of control and intentionality. In addition to the convergent validity of the four PsyCap elements there is also substantial empirical evidence of discriminant validity (Alarcon, Bowling, & Khazon, 2013; Bryant & Cvengros, 2004; Magaletta & Oliver, 1999). Although hope, self-efficacy, and optimism are reflecting positive expectancies, they are not identical constructs (Magaletta & Oliver, 1999). While "optimism" has been defined as positive "generalized outcome expectancies" (Scheier & Carver, 1985, p. 219), Snyder, Harris et al. (1991) defined "hope" as "…a cognitive set that is based on a reciprocally derived sense of a successful a) agency (goal-directed determination) and b) pathways (planning of ways to meet goals)" (p. 571). Thus, hope reflects two related but different sub-dimensions - the first deals with the determination to achieve one's goal, and the second deals with the specific means of pursuing one's goal (Alarcon et al., 2013). Furthermore, optimism and hope differ in that optimism includes expectancies about outcomes obtained through others or other forces, whereas the way component of hope includes unique contribution to outcomes obtained by the self (Magaletta & Oliver, 1999). In other words, hope is more explicitly related to *self-initiated* actions one can take to create a prosperous future for oneself (Gallagher & Lopez, 2009). On the other hand, the optimistic person believes that somehow – either through luck, the actions of others, or one's own actions – their future will be successful and fulfilling (Alarcon et al., 2013). Although optimism shares characteristics with self-efficacy and hope (e.g., positive internalization) it is unique regarding its scope and agency (Youssef & Luthans, 2011). Optimism consists of a broader scope as it involves an overarching positive expectation of the future in contrast to being goal-specific (PsyCap hope) or context-specific (PsyCap self-efficacy). Furthermore, optimism uses both internal and external attributions, whereas hope and self-efficacy are exclusively internally derived (Youssef & Luthans, 2011). For individuals to maintain positivity after setbacks or failures these external attributions are considered specifically important. In this context, resilience has some similarities with the other PsyCap components. For example, perseverance is shared with self-efficacy, while adaptive processes are common with hope and resilience, and the balance between external and internal resources is central to both the resilience and optimism components of PsyCap (Youssef & Luthans, 2011). Despite the many similarities, there are also clear differences between the PsyCap elements. Factor analyzes have also shown that the four elements can be distinguished from one another. Further evidence and numbers on the common variance between the four PsyCap elements can be found in Luthans, Avolio et al. (2007) and Dawkins, Martin, Scott, and Sanderson (2013). The next chapter deals with the measurement and development of positive psychological capital.

1.5 Measurement and Development of PsyCap

Measurement of PsyCap

In order to meet the POB criteria of measurability, the development of psychometrical instruments for evaluating PsyCap has been a central aspect of POB research. Luthans, Youssef, and Avolio (2007c) drew from recognized, published measures for hope (Snyder et al., 1996), self-efficacy (Parker, 1998), resilience (Wagnild & Young, 1993), and optimism (Scheier & Carver, 1985). As those measures varied in terms of the number of items, Likert scale formats, as well as the extent to which they were state-like and relevant to the workplace, some statements were revised or removed. The authors determined and then adapted six of the most relevant items for each of the four PsyCap elements on a 6-point Likert scale ranging from 1 = “strongly disagree” to 6 = “strongly agree”. Subsequently, a 24-item measure, named Psychological Capital Questionnaire (PCQ; Luthans, Youssef, & Avolio, 2007c) was developed. A compound PsyCap score is calculated from the mean subscale scores, thus producing a score out of 6. Scores range between a minimum of 24 and a maximum of 144 points. Higher scores indicate more positive PsyCap. To measure PsyCap, there are three validated questionnaires available: The 24-item Psychological Capital Questionnaire (PCQ, Luthans, Youssef, & Avolio, 2007c), a shorter 12-item version (Avey, Avolio, & Luthans, 2011), and an implicit Psychological Capital Questionnaire (I-PCQ, Harms & Luthans, 2012). The widely used PCQ-24 self-report has been utilized in nearly every research on Psychological Capital (Avey et al., 2011; Newman et al., 2014). However, within the last years the shorter PsyCap measure and the implicit version have been gaining more usage (Luthans et al., 2015). The PCQ-12 was developed by psychometrically selecting from the PCQ-24 four items for hope (two for agency and two for pathways), three items for self-efficacy and resilience, and two items for optimism (Avey et al., 2011). It has also been successfully used in an increasing number of published research studies (e.g. Avey et al., 2011; Baron et al., 2013; Huang & Luthans, 2014; Norman, Avolio, & Luthans, 2010). To address the problem of social desirability and falsification with self-reporting measures in general, and particularly the “I should be positive” mindset associated with measures such as the PCQ, Harms and Luthans (2012) developed and validated the Implicit Psychological Capital Questionnaire (I-PCQ, 8 items). In contrast to the PCQ self-report measures, the I-PCQ developed items using the HERO definitions and then adding filler items. The basic idea of I-PCQ is that respondents rate the extent to which each definition resembles “someone” (not themselves) in positive (e.g., “Someone has a new job”), negative (“Someone makes a mistake at work”), and neutral situations (“Someone talks to his/her supervisor”) (Luthans et al., 2015). The respondents are asked to rate their response on a 7-point Likert scale ranging from -3 (The opposite is very true of this character) to +3 (Very true of this character). The I-PCQ score is calculated from item hope (Believing that the person can accomplish the goal), item self-efficacy (Feeling confident and self-assured in the own ability), item resilience (Believing that the person can bounce back from any setback that have occurred), and item optimism (Expecting good things to happen in the future) from all three statements. The other four items are filler items. In sum, the three PsyCap measures not only vary in the total number of items and the number of items measuring each PsyCap element but also in the number of reversed-score items (three in the PCQ-24, none in the PCQ-12 and I-PCQ) and the number of filler items (none in the PCQ-24 and PCQ-12, and four in the I-PCQ). Some studies have shown that reversed-score items of the PCQ-24 tend to be problematic (Avey et al.,

2011; Dawkins et al., 2013; Luthans & Youssef-Morgan, 2017). Therefore, some researchers suggested eliminating them (Cid, Martins, Dias, & Fidelis, 2020). However, despite the concerns about reversed-score items, most of the previous research suggests that the PCQ-24 developed by Luthans et al. has acceptable construct validity (Luthans, Youssef, & Avolio, 2007c). Therefore, the doctoral student decided to use this instrument for the two studies. In addition, the PCQ-24 was selected for the studies as it is the standard and most widely-used self-report measure in the context of organizations for PsyCap, and has been empirically validated by Luthans, Avolio et al. (2007).

Meanwhile, the PCQ measure has repeatedly proven its reliability and validity and has been used to statistically determine the overarching nature of PsyCap and its added value over its individual elements in predicting outcomes (Avey et al., 2011; Dawkins et al., 2013). Reported reliability alphas for PsyCap have been above the minimal acceptable .70 level (Leary, 2008). In the PCQ-12, reported reliability alphas for PsyCap (mentioned in four studies) range between .68 and .92 (see Dawkins et al., 2013). In the PCQ-24, reported reliability alphas for PsyCap (mentioned in 22 studies) range between .75 and .95 (see Dawkins et al., 2013). Accordingly, the PCQ-24 has a higher reliability. In addition, studies that also examined the internal consistency for the individual elements have generally produced adequate results (Dawkins et al., 2013). It is noteworthy, however, that the internal consistency for resilience (α = .63-.66) and optimism (α = .63-.69) tends to be consistently lower than that reported for hope (α = .70-.87) and self-efficacy (α = .70-.92) (Dawkins et al., 2013). One reason for this might be the inclusion of items with reverse ratings in the optimism and resilience subscales, as such reverse-scored items can reduce the reliability of the scale (Schmitt & Stults, 1985). Moreover, it has been suggested that understanding the stability of a construct over time can provide essential information regarding the distinction between state and trait and that test-retest reliability is an optimal way of assessing this distinction (Avey, Luthans, & Mhatre, 2008). Yet, only one study examined PsyCap test-retest reliability (Luthans, Avolio et al., 2007), where it was reported that PsyCap exhibited lower test-retest reliability (α = .52) than 'trait-like' core self-evaluations (CSE; α = .87) over a period of four weeks. This clearly demonstrates the state-like character of PsyCap.

Throughout the development of psychological capital measures, proponents have sought to assert convergent and discriminant validity between PsyCap and other positive constructs, such as core self-evaluations (Dawkins et al., 2013). Although conceptual similarities between PsyCap and CSE (e.g. general and specific efficacy, optimistic explanatory style, and resilience) are recognized (Avey, Luthans, & Youssef, 2010), only few studies have examined the discriminant validity between both concepts. There is evidence that PsyCap and CSE differ empirically, as indicated by relatively low correlations and regression analyzes supporting discriminant validity (Luthans, Avolio et al., 2007) Further evidence has also confirmed discriminant validity between PsyCap and perceived employability (Chen & Lim, 2012); creativity and authentic leadership (Rego, Sousa, Marques, & Cunha e, 2012); authentic leadership and positive work climate (Woolley, Caza, & Levy, 2011); and collective PsyCap and trust (Walumbwa et al., 2011). While these results are encouraging, Dawkins et al. (2013) suggest that there is not enough evidence to establish discriminant validity of a construct, especially one that is quickly gaining scientific attention. Despite the acceptance of the PCQ in the literature, the measure was also criticized. In particular, it has been suggested that much of the psychometric validation for the

original scales included in the PCQ was performed in non-organizational settings (Little, Gooty, & Nelson, 2007). Luthans et al. (2010) admit that the methods used to create the PCQ may undermine the construct validity of the PCQ and PsyCap. As a result, further refinement of the measure is needed to further improve the construct validity of PsyCap.

Development of PsyCap

What distinguishes PsyCap from other positive constructs (e.g., core self-evaluations) is its malleability and openness to development (Luthans, Youssef, & Avolio, 2007c). Based on previous literature confirming the effectiveness of interventions to develop each of the four PsyCap elements (Bandura, 1997; Masten, 2001; Seligman, 2006; Snyder, 2000), Luthans, Avey et al. (2006) put forward their suggestion for a "micro-intervention", the Psychological Capital Intervention (PCI). In general, those PsyCap training interventions last between one and three consecutive hours, following the PsyCap Intervention (PCI) model (see Figure 1-4).

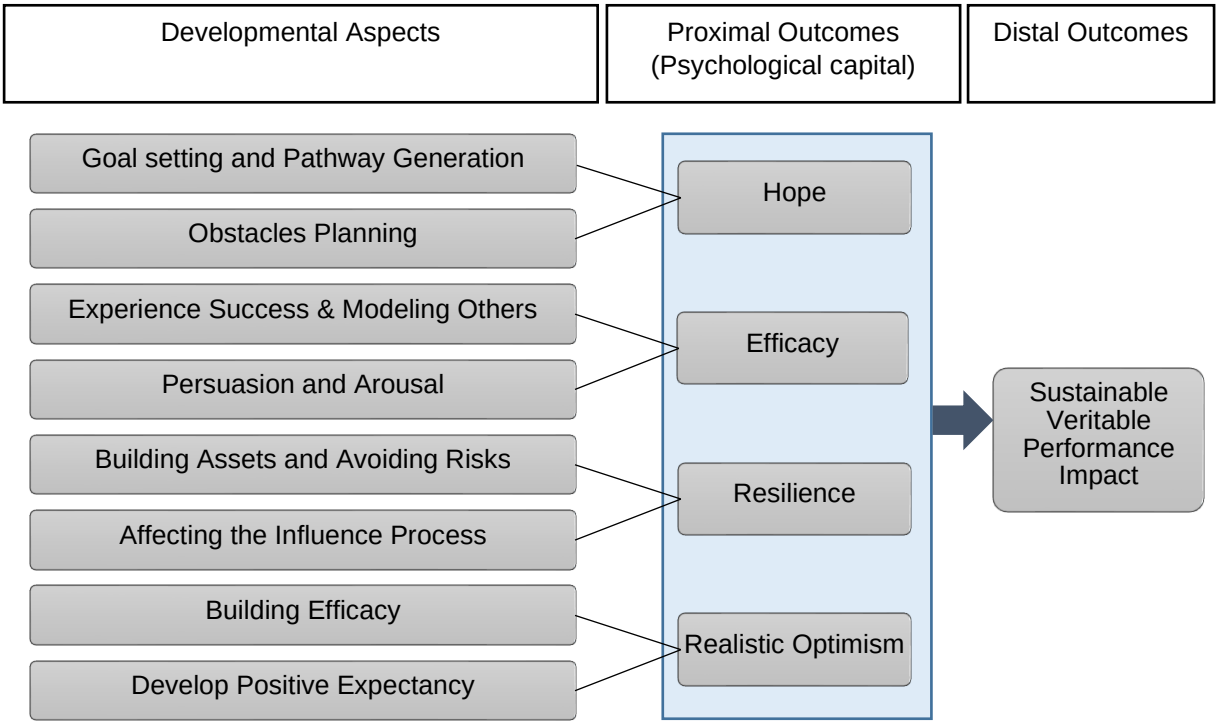


Figure 1-4. Psychological Capital Intervention (PCI) adapted from Luthans, Avey et al. (2006).

This framework is geared towards further developing each of the four PsyCap elements in particular as well as the overall PsyCap and a positive mindset (Luthans, Avey et al., 2006; Luthans, Youssef, & Avolio, 2007a). According to the authors, each PsyCap element can be developed if it is addressed through specific exercises in the training which are described in more detail below. Figure 1-4 illustrates a typical psychological capital intervention (PCI) indicating the respective developmental aspects of each HERO resource, PsyCap as proximal outcome as well as the sustainable veritable performance impact as distal outcome. The exercises in the PCI have the proximal objective of enhancing

participants' PsyCap but predominantly the distal objective will have a desirable impact on the attitude, behavior and performance for the individual, team, and organization.

With regard to the positive psychological capacity for hope, the comprehensive theory-building, research and development processes of the positive psychologist Rick Snyder (2000) is referenced. He defines agency, pathways, and goals as the primary components of hope. In developing PsyCap hope, there are three elements in the psychological capital intervention (PCI) that consist of designing goals, generating pathways, and overcoming obstacles. At the beginning of the PCI, the participants identify goals that are personal and valuable for them. After having defined the goals, the workshop moderator explains the optimal goal design. This includes having a) concrete end-endpoints for success measurement, b) an approach (instead of an avoidance) framework, which means that participants are moving towards their goals in contrast to staying away from them (e.g., increase job satisfaction instead of decrease employee complaints), and c) sub-goals to celebrate small successes on the way to goal attainment (Snyder calls this 'stepping' in his hope interventions) (Luthans, Avey et al., 2006). Next, the participants develop pathways to their desired goals. They are asked to create multiple pathways by brainstorming as many alternative paths as possible. Luthans et al. (2010) emphasize that a crucial element of delivering the PCI are guided small group discussions. Thus, employees are encouraged to share their individual goals and pathways with the group to generate additional paths and to set an example of positive goal-oriented behavior for the group. This bi-directional group process of vicarious learning and modeling is postulated to further increase the level of self-efficacy of the participants through the generation of additional pathways to achieve their stated goal, while at the same time strengthening their positive expectations (optimism) to achieve this goal. Furthermore, it is theorized that the generation of multiple pathways for goal attainment increases the participants' resilience by allowing them to "bounce back" by choosing an alternative pathway if an original pathway is blocked or faced with a challenge (Luthans et al., 2010).

Next, resilience can be developed through asset-, risk-, and process-focused strategies that focus on the design and effective use of assets to mitigate risk factors (Masten et al., 2009). To strengthen the resilience component, participants are asked to visualize past setbacks and how they overcame such difficulties. This exercise is about rethinking circumstances cognitively, emotionally, and behaviorally as well as assessing the realistic impact of their setback in terms of what is in the person's control, and possible options for taking actions. Furthermore, the participants learn to enhance their personal resources (i.e., assets) by listing their skills, talents, and abilities. Optimism can be also enhanced through self-efficacy and hope training (Luthans, Avey et al., 2006). For example, participants forecast unfavorable events by expecting potential obstacles, and then afterwards create different pathways to reduce their impact. With this, the pessimist's opportunities to expect bad things decreases. By counteracting pessimism, this process supports the development of realistic and optimistic expectations and is strengthened by positive 'self-talk' (Luthans, Avey et al., 2006).

In summary, PsyCap hope can be developed through goal setting, pathway generating, as well as obstacle planning. PsyCap self-efficacy can be developed through mastery experiences (e.g., experience success), modeling and vicarious learning, social persuasion, and physiological and psychological arousal. PsyCap resilience can be developed through asset-focused strategies (e.g.,

building assets), risk-focused strategies (e.g., avoiding risks), and process-focused strategies (e.g., affecting the influence process). Lastly, PsyCap optimism can be developed through leniency for the past and appreciation for the present (e.g., develop self-efficacy) as well as opportunity seeking for the future (e.g., develop positive expectancy).

Brief PsyCap intervention studies confirm the possibility of PsyCap development and enhancement (Dello Russo & Stoykova, 2015; Demerouti, van Eeuwijk, Snelder, & Wild, 2011; Deniz, Ertosun, Erdil, & Lutfihak, 2015; Luthans et al., 2008; Luthans et al., 2010; Luthans, Avey et al., 2006; Luthans, Luthans, & Avey, 2014). They use pretest-posttest (utilizing PCQ measures) control group experimental designs. Applying experimental, treatment, and control group random assignment, PsyCap has been empirically demonstrated to have an impact on performance (Luthans et al., 2010; Peterson, Luthans, Avolio, Walumbwa, & Zhang, 2011). The PCI has been empirically conducted in both online (Luthans et al., 2008) and classroom training (Luthans et al., 2010). As a result, the participants' PsyCap increased on average about 2% in these micro-intervention studies (Luthans et al., 2015). More importantly, this statistically significant increase in PsyCap development occurred in the experimental groups who performed the PCI training, but not in the randomly assigned control groups taking part in a commonly used group dynamics exercise with equivalent participants under the same conditions (Luthans et al., 2015). The first PsyCap micro-intervention studies under strictly controlled conditions (e.g., random assignment into experimental and control groups) were carried out with emerging adults (i.e., management students). The same positive results (approx. 2% increase in the measured PsyCap) were also found in 2- to 3-hour micro-intervention studies with a wide range of managers and employees from different types of professions and organizations (Luthans et al., 2008; Luthans et al., 2010; Luthans, Avey et al., 2006). The treatment groups in PsyCap interventions usually consist of 40-190 people (see Dawkins et al., 2013 for a comprehensive review) and if control groups are present in the studies, the number of people is usually smaller than in the treatment groups (Dello Russo & Stoykova, 2015). Initial evidence has shown significant increases in PsyCap with a small effect size (d =.19) for PsyCap online trainings (Luthans et al., 2008) and small to medium effect sizes (d =.31-.40; Luthans et al., 2010) for classroom trainings (Luthans et al., 2010). Additionally, PsyCap proponents have also communicated a quantifiable return on investment for the PCI in order to demonstrate the effectiveness of PCI regarding increased PsyCap and improved work performance (Luthans et al., 2010). Preliminary utility analyzes have estimated a robust return on investment (ROI) in over 200% for a PsyCap training intervention (see Luthans, Youssef, & Avolio, 2007c for detailed quantitative utility analysis).

Demographic information such as gender, age, or education is often controlled in PsyCap studies (Avey, 2014; Lizar, Mangundjaya, & Rachmawan, 2015). However, according to Avey (2014) they are barely associated with PsyCap, and if they are related, the relationship is not uncommonly weak. Nevertheless, a study has shown that age was a significant predictor of PsyCap whereas gender and tenure were not (Avey, 2014). The study, however, did not indicate in which direction age was a significant predictor which reduces the significance of the results. In sum, the category of demographic information was the weakest predictor of PsyCap and the three demographic variables explained only 2% of the variance in PsyCap (Avey, 2014). Furthermore, a study reported that there are significant differences between

respondents with different educational backgrounds. It showed, for example, that respondents with a bachelor degree have higher PsyCap means compared to those with a diploma degree (Lizar et al., 2015). However, no additional explanations for the differences in education were mentioned in the study and no PsyCap intervention was conducted. Accordingly, the results should be viewed with caution. Further results on PCI trainings show a stronger relationship between PsyCap and work-related outcomes for U.S.-based samples in contrast to those outside the United States such as China, India, and Australia (Avey et al., 2011). No reasons for such cultural differences are mentioned in the meta-analysis by Avey et al. (2011) and, in addition, the literature on cultural differences in PsyCap interventions is still deficient. While the effect sizes were relatively equal between student and working adult samples, there was a slightly stronger effect size for studies conducted in the service industry in contrast to manufacturing (Avey et al., 2011). In the next section advantages and disadvantages of different PsyCap training formats are discussed.

Differentiation between different PsyCap Training Formats

There are at least three types of PsyCap trainings, which are explained in more detail: classroom, web-based and gamified (online) trainings. There are different advantages and disadvantages for the distinct training formats. They differ in the following aspects: flexibility, accessibility, effectiveness, and gamification elements. Several studies have been conducted examining the effectiveness of web-based and classroom instructions to deliver education, training, and interventions (Sitzmann, Kraiger, Stewart, & Wisher, 2006). Online courses such as eLearning's are increasingly replacing traditional classroom training courses. The advantage is that they offer flexibility and the learner can access the learning content independent of time, location, type of device, and duration. However, when organizations consider implementing web-based instructions, caution is warranted, because the relative effectiveness of the training may depend on both the intended learning outcomes and the training conditions (Sitzmann et al., 2006). One advantage of classroom trainings is that a trainer is physically present and can be consulted if there are any questions. This is usually not the case with online trainings. However, one disadvantage of classroom trainings is that they take place on a specific day and the participants have to be physically present. Next, PsyCap development courses must be carried out in the right environment in order to be effective (Luthans & Youssef-Morgan, 2017). In contrast to technical training, which focuses on the development of specific skills and behavioral patterns, PsyCap development promotes positive thinking patterns that, over time, can question and replace deep-rooted assumptions and beliefs (Luthans & Youssef-Morgan, 2017). This change requires a positive employee organizational climate that encourages and accepts the employee's newly gained intentionality, and sense of control. For example, if the developing employee is dealing with rigid structures, inadequate autonomy, toxic leadership, ineffective team dynamics, or insufficient resources, it is unlikely that PsyCap will manifest itself in this environment or achieve the desired positive outcomes in terms of attitudes, behaviors, and performance (Luthans & Youssef-Morgan, 2017). As classroom and web-based instructions create very different learning environments (Arbaugh, 2000; LaRose & Whitten, 2000) caution is required to avoid forcing participants into online courses, which may ultimately result in some of them not mastering the course material (Sitzmann et al., 2006). The instructional materials

typically include text and images that explain what is being learned and include self-assessment tests after the self-learning (Da, He, & Zhang, 2020).

In addition, there are gamified PsyCap applications. The difference between online training and gamified online training formats lies in the presence of gamification elements in gamified online trainings. Examples for gamification elements are for example points, badges, rankings and lists, or status achievements. One advantage of online and gamified online trainings is that people can be reached simultaneously and independent from time zone, work region, and location to participate in such training programs. Nevertheless, one disadvantage of gamified online trainings is that they are not for everyone. Further information on gamification is described in the next section and in chapter 1.6. The next section deals with innovative applications for the PsyCap development.

Innovative PsyCap Applications

In addition to already existing PsyCap development online and face-to-face trainings, where relevant PsyCap increases have occurred, there is a need for new types of PsyCap applications to reach more people simultaneously and independent from time zone, region, and location. Although these studies have obtained meaningful results in enhancing individual's PsyCap (Luthans et al., 2008; Luthans, Avey et al., 2006), they have largely ignored new ways to promote the psychological capital of people. Furthermore, HR managers should consider more flexible methods of administering PsyCap interventions (Da et al., 2020). Aside from positive video games such as Jane McGonigal's (2015) "SuperBetter", smartphone apps like "Happify" and inspiring YouTube videos, customized gamification techniques seem to have a great potential impact to engage in developing PsyCap (Luthans & Youssef-Morgan, 2017). As an illustration, McGonigal's (2015) game "SuperBetter" was designed to improve resilience and make it easier to bounce back and overcome life challenges. By playing just a few minutes a day, nearly one million people are able to use this game to build resilience, improve their well-being and achieve goals. In a randomized controlled trial (Roepke, Jaffee, Riffle, McGonigal, & Broome, R.: Maxwell, B., 2015) and a clinical trial (Worthen-Chaudhari et al., 2017), playing "SuperBetter" improved seven pathways to higher resilience including optimism, self-efficacy, perceived social support, life satisfaction, less anxiety, fewer symptoms of depression and less hopelessness. In the randomized controlled trial 283 adult smartphone users with significant depression symptoms according to the Center for Epidemiological Studies Depression questionnaire (CES-D) were randomly assigned to one of three conditions: 1) a SuperBetter version using cognitive-behavioral therapy and positive psycho-therapy strategies to combat depression; 2) a general SuperBetter version on self-esteem and acceptance; 3) a waiting list control group. The two SuperBetter groups were instructed to use SuperBetter for 10 minutes daily for one month and to complete psychological distress and well-being questionnaires every two weeks. As a result, the SuperBetter participants achieved greater reductions in the CES-D scores than the waiting list control group in the posttest (Cohen's d = 0.67) and in the follow-up (d = 1.05) (Roepke et al., 2015). In the clinical trial 20 participants, aged 13-18 years with concussion symptoms with more than 3 weeks after the injury received a standard of care for concussion. In addition, the experimental group also used the SuperBetter mobile health application as a gamified symptoms journal. As a result, symptoms and optimism improved more in the experimental

group than in the active control group (U = 18.5, p = 0.028, effect size r = 0.50 and U = 18.5, p = 0.028, effect size r = 0.51, respectively) (Worthen-Chaudhari et al., 2017). It is expected that the skills learned in such games will be transferred to real life, and the initial scientific findings (Roepke et al., 2015; Worthen-Chaudhari et al., 2017) do suggest that that these games help achieve the desired outcomes.

Furthermore, the smartphone app “Happify” is a fully automated web and mobile wellbeing intervention grounded in positive psychology, cognitive-behavioral therapy, and mindfulness-based stress reduction, which has offered wellbeing programs to over 3 million registrants to date (Parks et al., 2018). In an online study by Parks et al. (2018) there were first-time registrants on the Happify platform and they were randomly assigned to either participate in the Happify platform or in a psychoeducational comparison. They were further categorized according to their usage during the study: recommended usage (at least 2-3 activities per week) or low usage (usage below the recommended level). Participants were assessed on depressive and anxiety symptoms, and a composite measure of resilience at baseline and 8 weeks later. As a result, participants who used Happify at the recommended level (*N* = 222) reported less depressive and anxiety symptoms and greater resilience after 8 weeks than participants who used Happify at a low level (*N* = 250) or participants who used the psychoeducational condition at any level (Parks et al., 2018).

In addition, making real changes in behavior requires stepping away from a “one-time” intervention and instead, moving towards so-called ‘micro-learnings’ and giving participants the opportunity to practice a new behavior. While there is scientific evidence of the positive effects of gamification in general, there are still important discrepancies in the effectiveness of gamification across contexts and user groups (Hamari, Koivisto, & Sarsa, 2014). Gamification is based on traditional behavioral psychology principles such as positive feedback and contingent reinforcement, which actual games may or may not include (Luthans & Youssef-Morgan, 2017). Gamification, using video game design techniques and conditional reinforcement, has been very successfully used in industries such as hotels and airlines to attract, retain and grow their customer base (Luthans & Youssef-Morgan, 2017). Although just beginning to be used in HR training, Kinley and Ben-Hur (2015, p. 154) recently discovered that gamification “can boost people’s motivation, ability, and psychological capital”. Gamification seems to be of great importance due to its positive orientation for positivity and PsyCap (Luthans & Youssef-Morgan, 2017). Emphasis is placed on motivation, rewards, and developing strengths, as well as personal psychological resources that are aligned with positive psychological principles. Innovative PsyCap applications such as the development of gamification techniques are needed in the workplace to reach more people simultaneously and independent from time zone, region, and location. The next chapter deals in detail with the topic of gamification, which lays the foundation for study 1.

1.6 Gamification

This chapter provides a basic understanding of gamification, its meaning and terminology, as well as the application and implementation of gamification in companies. First, the term gamification is defined and differentiated from other concepts (chapter 1.6.1). Second, it is illustrated how gamification projects can be applied and implemented in companies (chapter 1.6.2).

1.6.1 Clarification of Terms and Differentiation

In the last few years, gamification has become a trend in the business and marketing sectors. Recently, it has drawn the attention of academics, educators, and practitioners from various fields (Seaborn & Fels, 2015). The term gamification describes the use of game-design elements in non-game contexts with the intention of modifying behaviors, increasing fidelity, or motivating and engaging people (Deterding, Dixon, Khaled, & Nacke, 2011) by leveraging human motivations present in games (e.g., rewards, socializing, and competition). The focus here is on gamifying elements of a process rather than the gamifying process as a whole (Shauchenka, Ternès, & Towers, 2014). Huotari and Hamari (2012) define gamification as “a process of enhancing a service with affordances for gameful experiences in order to support user’s overall value creation” (p. 19). This definition highlights the idea that experiences can only be designed for each user and cannot be guaranteed as outcome (Seaborn & Fels, 2015). In spite of its potential benefits, gamification is still a new topic in academic research (Hamari et al., 2014; Hamari & Keronen, 2017). The application of organizational games provides the player with real challenges implicated in enjoyable settings (Vesa, Hamari, Harviainen, & Warmelink, 2017). Cases like these were described in organizational training (Calderón & Ruiz, 2015; Hamari et al., 2014), financial and health sectors (Deterding et al., 2011), as well as service marketing (Huotari & Hamari, 2012). Gamification aims at fostering user experience (UX) through game elements (e.g., points, badges, leaderboard) motivating users to attain personal goals (Deterding et al., 2011; Huotari & Hamari, 2017). Previous research implies that user experiences can satisfy rudimentary psychological needs or trigger perceived pressure (Ryan, Rigby, & Przybylski, 2006; Wolf, Weiger, & Hammerschmidt) and herewith produce motivation value. This motivation value (attained e.g., through rewards, socializing, or competition) has been identified and associated with the so-called player types (Bartle, 1996). In particular, four main types of players can be considered: achievers, explorers, socializers, and killers. The achievers are motivated by mastery and rewards, the explorers are motivated by autonomy and self-expression, the socializers are motivated by social relatedness and status, and the killers are motivated by doing things to people and by demonstrating their superiority (Bartle, 1996). You need the ‘killer’ player type in an organization as a ‘game leader’ not only for your own team to be better than other competing teams, but also at the customer site to win against potential competition. For each of these player types, special gamification mechanics have been suggested to support the motivations involved (Marczewski, 2013). Thus, for example, mechanics that can correspond to an achiever’s motivation are the achievement of certain challenges and levels as well as the acquisition of points and badges (Gil, Cantador, & Marczewski, 2015).

Regarding a theoretical depiction of gamification, it should be mentioned that there is no uniform "gamification theory" in research. Furthermore, a large majority (87%) of applied gamification research does not refer to, or cover theoretical foundations (Seaborn & Fels, 2015). However, there are a few exceptions such as Deci's and Ryan's self-determination theory (SDT, Deci, Koestner, & Ryan, 1999) on extrinsic and intrinsic motivation (Thom, Millen, & DiMicco, 2012; Witt, Scheiner, & Robra-Bissantz, 2011) concerning the research design and interpreting results. A further example is Gnauk, Dannecker, and Hahmann (2012), who utilized SDT to conceptualize gamification in terms of intrinsic and extrinsic motivation. Zichermann (2011) states that intrinsic motivation belongs to an behavior or activity carried out because it corresponds to one's inner values, whereas extrinsic motivation refers to external rewards such as money or status that are offered in exchange for involvement in certain behaviors or activities. Overall, gamification is frequently positioned as a tool that can be utilized to promote extrinsic and intrinsic motivation to perform specific tasks through the selective use of game elements (Seaborn & Fels, 2015). In addition, operant conditioning (Skinner, 1953) is cited in two publications (Gåsland, 2011; Li, Grossman, & Fitzmaurice, 2012). Operant conditioning refers to specific consequences that are associated with a voluntary behavior, which means that rewards are introduced to increase a certain behavior (Skinner, 1953).

In order to understand the field of gamification better, gamification has to be differentiated from similar formats and games. Crawford (1984) requires that games are representations of some reality, that they are based on interaction between the user and the system, and that they provide conflict, but also safety through simulation. The game designers Salen and Zimmerman (2004) define a game as "a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome" (p. 80). Juul suggests that all games have the following six main components: rules, variable, quantifiable outcomes, value-laden outcomes, player effort, player instrument, and negotiable consequences, with respect to real life effects. Games arise from a variety of combinations of these criteria in distinct proportions. In addition, whether an experience is a game or has game elements depends on the participants' perception (Seaborn & Fels, 2015). As gamification describes the use of game design elements, a short description is necessary. Game elements are defined as the parts that make up the game such as dynamics, mechanics or components (Deterding et al., 2011). Gamification elements can be easily integrated into work or learning processes by adding certain applications to software (Stieglitz, 2017). According to Hamari et al. (2014), frequent gamification elements are the awarding of points for certain activities and services, the provisioning of rankings and lists, the achievement of a certain status or the receipt of badges, the advancement to higher action levels, and progress indicators for tasks to be fulfilled (e.g., completion of profile information in a social network). Table 1-1 illustrates the terminology of game elements.

Table 1-1

Legend of Game Element Terminology adapted from Seaborn and Fels (2015)

Term	Definition	Alternatives
Points	Numerical units indicating progress	Experience points, score
Badges	Visual icons signifying achievements	Trophies
Leaderboards	Display of ranks for comparison	Rankings, scoreboard
Progression	Milestones indicating progress	Levelling, level up
Status	Textual objects indicating progress	Title, ranks
Levels	Increasingly difficult environments	Stage, area, world
Rewards	Tangible, desirable items	Incentives, prizes, gifts
Roles	Role-playing elements of character	Class, character

A related concept of gamification is “serious gaming.” Serious gaming is about games that serve a serious or productive goal and goes beyond pure entertainment. Abt (1971) understands serious games as those applications that pursue an explicit and carefully thought-out educational purpose and are not primarily intended for entertainment. At first glance, serious games and gamification seem to have dedicated themselves to the same task: making learning content more exciting and entertaining by conveying it in a playful way. However, the approach and ultimately the focus of serious games and gamification are very different. Serious games want to convey content, while the intention of gamification is to change certain behavior or habits, whereby gamification is not limited to one branch, a certain content, or the virtual world (Dresse, 2016). In sum, together with serious games, gamification uses games for other purposes than their normal expected use for entertainment (Deterding et al., 2011).

1.6.2 Application and Implementation of Gamification Projects in Companies

Companies using gamification fall into two main categories: first, consumer and service organizations that want to enhance their loyalty solutions, and second, companies that are looking to find the right tools to help engage their employees (Dale, 2014). Studies show that many companies have started to establish gamified processes in various contexts such as intra-organizational communication, training, and generating ideas (Hamari et al., 2014). For example, Ford used gamification principles to motivate its employees to use online learning materials, and T-Mobile has done the same to encourage the use of customer service tools, which significantly improved customer satisfaction (Kinley & Ben-Hur, 2015). In addition, products and companies have emerged whose goal is to gamify standard software and provide new solutions. The focus within corporations has recently shifted to a more inward-looking context, in which the employees are targeted and not the customers. Enterprise gamification therefore describes the integration of playful elements into the company's work and learning processes (Stieglitz, 2017). The aim of enterprise gamification is for users to feel a higher motivation to complete tasks

through playful approaches. According to Dale (2014), some of the benefits a company can hope for from well-implemented gamification strategy are:

- "increased motivation and productivity of employees;
- alignment of goals and expectations of employees, stakeholders, and customers with the company's goal;
- employees fully engaged with new company initiatives;
- employees converted into advocates of the company" (p. 87).

The analysis of the initial situation and the needs are of great importance in order to develop a suitable introduction and utilization concept for gamification elements (Stieglitz, 2017). The design of a meaningful gamification project in the company is not a trivial task, since different competencies (e.g., IT, psychology, management) are required and different actors need to be involved. In addition, when designing the gamification functions, they should be as intuitive and understandable as possible, the complexity should be kept low in order to avoid cognitive overload, which can disturb the playful atmosphere, and information deficits should be avoided (Stieglitz, 2017). The introduction of gamification also requires that, in addition to management, other actors such as works councils (where applicable), the target audience, the communications department, and the IT department are involved. Furthermore, the introduction and use of gamification elements pose potential challenges for companies and require a systematic and cautious approach. Stieglitz (2017) states that the diversity and complexity of different gamification approaches make selection decisions and evaluation of success difficult. It is therefore important to start by thinking about what needs to be achieved and what concrete processes and metrics are appropriate to make progress measurable (Stieglitz, 2017). In addition to the technical set-up, it is of central importance to identify the needs of the employees and to know their preferences and level of acceptance of gamification while taking the corporate culture into account (Dale, 2014).
Gamified online projects in particular offer a wealth of options for an entertaining user experience (UX). In addition to personalization as well as anonymization by changing the name or photo, online projects also include the possibility to participate in quiz questions and form a team with other users. The awarding of virtual badges can increase motivation for tasks that have been completed. Additional built-in elements such as motivational and informative videos, articles and infographics, and chapter ratings can also strengthen user loyalty. However, it is also clear that simply putting a template consisting of points, badges, and leaderboards (PBL) over a product, does not mean it is gamified. Accordingly, no major changes in behavior can be expected in terms of user motivation nor behavioral change. Moreover, if the mechanics behind the gamification approaches are misleading or unknown, this can reduce the attractiveness for users (Stieglitz, 2017). If the assignment of rewards and status appears arbitrary, the motivation to achieve the set goals decreases. This effect can be so strong that the employee develops an attitude of rejection and the playful elements can be perceived as a burden or injustice (Stieglitz, 2017). For this reason, it is important to communicate clearly what kind of mechanics lay behind a particular gamification element and the rollout of gamification elements must be planned carefully. Introducing new playful functions without explaining them after the rollout, should be avoided (Stieglitz, 2017).

Nonetheless, advances in technology and connectivity, widespread access to smartphones and other electronic devices, as well as the technological competence of new generations who are now dominating the workforce, make gamification of positivity and PsyCap development necessary (Luthans & Youssef-Morgan, 2017). Gamification offers an approach to creating a supportive environment that can increase people's motivation, skills, and psychological capital, and thus their attempts to change behavior (Kinley & Ben-Hur, 2015). The link to organizational psychology research lies in the emphasis on incentives (e.g., points, badges, leaderboard) as triggers and regulators of actions as well as employee motivation and training. Therefore, it is of utmost importance to develop and implement novel gamification applications to enhance the PsyCap of individuals.

1.7 Purpose and Hypotheses of the Studies

To date, psychological capital (PsyCap) training interventions have rarely been replicated using different settings with different populations and training facilitators who are not among the earlier PsyCap trainers like Luthans and colleagues (Dello Russo & Stoykova, 2015). When discussing new and inspiring sustainability promoters for psychological capital development programs (see chapter 1.5), gamification can be a potentially powerful novel application for positivity in general and PsyCap in particular (Luthans & Youssef-Morgan, 2017). So far, there are no PsyCap interventions that include innovative approaches such as the inclusion of gamification techniques into such trainings. This dissertation closes this gap by transferring and applying the scientific findings of PsyCap to the level of a multinational software company as well as connecting the PsyCap content with gamification elements in a gamified online training, *HERO of the Jungle*. This is a new approach and a unique value proposition of this thesis which has not been tested before. Therefore, the primary goal of this dissertation is to examine if PsyCap as a core construct can be developed in the workplace through a gamification training program based on the four components hope, self-efficacy, resilience, and optimism. In this context, it is also intended to investigate how the implementation of several classroom trainings, *Personal Resource Development*, affect the PsyCap of individuals. More specifically, the present thesis focuses on the realization and evaluation of an innovative gamified online training (study 1) and nine classroom trainings (study 2) to enhance the individual PsyCap of employees within the development department of a multinational software corporation. The intention is to compare both methods, the gamified online training and the face-to-face trainings, with one another to be able to examine differences in the effectiveness of such PsyCap interventions (PCIs) in terms of costs and time aspects. The following studies will help to further establish PsyCap as a meaningful construct of organizational behavior (OB) and provide valuable insights into improving work-related functioning and employee engagement. Figure 1-5 demonstrates the related studies and hypotheses investigated in this thesis.

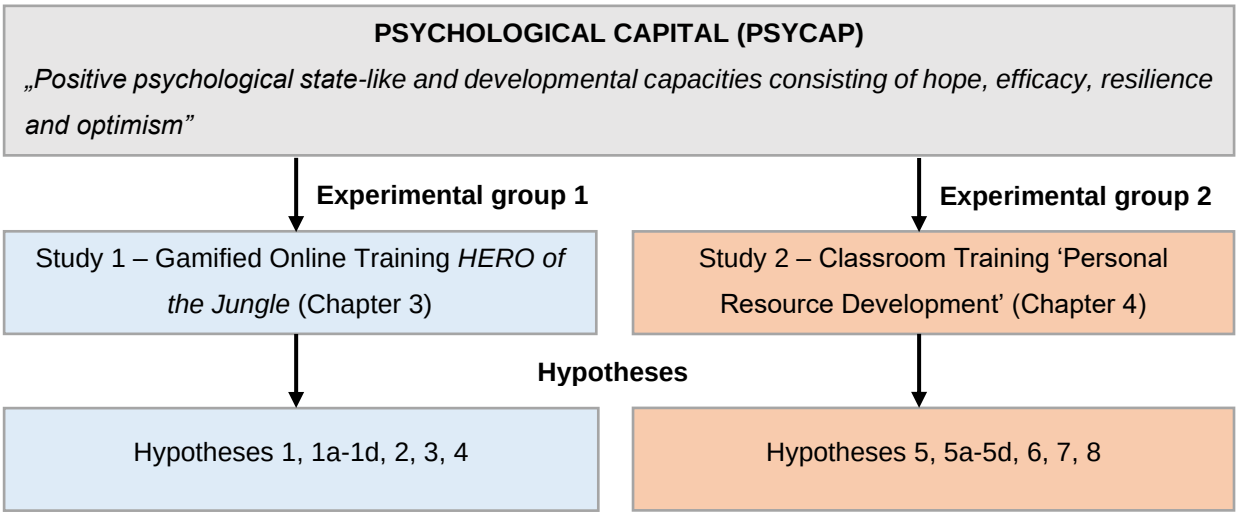


Figure 1-5. Related Studies and Hypotheses in this Dissertation.

The effectiveness of the gamified online training and the classroom trainings are analyzed to determine whether the two experimental groups (EG 1 and EG 2) show a stronger increase in psychological capital after the measure compared to the control groups (CG 1 and CG 2) which did not participate in a PsyCap intervention. The participants from each groups were asked to complete an online survey at three different points in time: T1 (before the PsyCap training), T2 (directly after the PsyCap training), and T3 (two months after the PsyCap Training). PsyCap as a core construct is examined on the basis of the given scientific research and the theoretical background. PsyCap interventions have been empirically conducted in both online (Luthans et al., 2008) and classroom training (Luthans et al., 2010) including initial evidence that shows significant increases in PsyCap with small to medium effect sizes (d=.31-.40; Luthans et al., 2010). In addition, these statistically significant increases in PsyCap enhancement only occurred in the experimental groups who conducted the PCI training, but not in the randomly assigned control groups under the same conditions (Luthans et al., 2015). Therefore, the aim of the two studies is to examine whether these results can be replicated and are applicable at the multinational software company level. For the purpose of the first study (gamified online training *HERO of the Jungle*), the following primary hypothesis is tested:

Hypothesis 1:
EG 1 will show a significant increase in their PsyCap at T2 and T3 compared to CG 1.

Given that the four elements of PsyCap are as well individually developed through the training session, the following hypotheses to be tested are:

Hypothesis 1a:
EG 1 will show a significant increase in their hope at T2 and T3 compared to CG 1.

Hypothesis 1b:
EG 1 will show a significant increase in their self-efficacy at T2 and T3 compared to CG 1.

Hypothesis 1c:
EG 1 will show a significant increase in their resilience at T2 and T3 compared to CG 1.

Hypothesis 1d:
EG 1 will show a significant increase in their optimism at T2 and T3 compared to CG 1.

As already described earlier, PsyCap is strongly related to desired employee attitudes, behaviors, and performance (Avey et al., 2011). According to an exploratory study from Larson and Luthans (2006b), a positive relationship between employees' score on PsyCap and their job satisfaction, as well as their commitment to their organization was determined. Furthermore, it has been proven that employees with higher levels of PsyCap are also more engaged at work (Joo, Lim, & Kim, 2016). In previous studies, job satisfaction, work engagement, and organizational commitment were chosen as outcome indicators of the PsyCap intervention (PCI), as they are the most common and fundamental work-related attitudes and behaviors (Avey et al., 2011). For this reason, these three outcome variables are referred to in this thesis as well. Therefore, the following hypotheses are posited:

Hypothesis 2:
The employees' level of PsyCap from EG 1 and CG 1 will be positively related to their job satisfaction at T1, T2, and T3.

Hypothesis 3:
The employees' level of PsyCap from EG 1 and CG 1 will be positively related to their engagement at work at T1,T2, and T3.

Hypothesis 4:
The employees' level of PsyCap from EG 1 and CG 1 will be positively related to their organizational commitment at T1, T2, and T3.

For the purpose of the second study (classroom trainings *Personal Resource Development*), the following primary hypothesis is tested:

Hypothesis 5:
EG 2 will show a significant increase in their PsyCap at T2 and T3 compared to CG 2.

Like in study 1, as the four PsyCap components are as well individually developed throughout the course, the following hypotheses to be tested are:

Hypothesis 5a:
EG 2 will show a significant increase in their hope at T2 and T3 compared to CG 2.

Hypothesis 5b:
EG 2 will show a significant increase in their self-efficacy at T2 and T3 compared to CG 2.

Hypothesis 5c:
EG 2 will show a significant increase in their resilience at T2 and T3 compared to CG 2.

Hypothesis 5d:
EG 2 will show a significant increase in their optimism at T2 and T3 compared to CG 2.

Like in study 1, job satisfaction, work engagement, and organizational commitment are chosen as outcome indicators of the PsyCap intervention (PCI) because they are the most common and fundamental work-related attitudes and behaviors (Avey et al., 2011). Hence, the following hypotheses are postulated:

Hypothesis 6:
The employees' level of PsyCap from EG 2 and CG 2 will be positively related to their job satisfaction at T1, T2, and T3.

Hypothesis 7:
The employees' level of PsyCap from EG 2 and CG 2 will be positively related to their engagement at work at T1, T2, and T3.

Hypothesis 8:
The employees' level of PsyCap from EG 2 and CG 2 will be positively related to their organizational commitment at T1, T2, and T3.

In summary, one assumption is that the experimental groups (EG 1 and EG 2) will experience a significant increase in their individual PsyCap at the second (T2, post-test) and third (T3, follow-up) measurement points in contrast to the control groups (CG 1, CG 2). Furthermore, the participants' PsyCap levels are hypothesized to be positively related to their job satisfaction, engagement at work and organizational commitment at T1, T2, and T3. In terms of differences between both PsyCap approaches, it is hypothesized that the number of participants in the gamified online training will be larger compared to the classroom trainings because of the possibility that the participants can register on the gamified online platform independently of their work region, location, and time. Furthermore, it is hypothesized that the discussions and exchanges with the colleagues in the classroom trainings will be perceived as positive and helpful as opposed to the gamified online training. The results of this dissertation represent a fundamental approach on how PsyCap can be developed, managed, and implemented in the workplace of a multinational software corporation to affect desirable outcomes. In addition, both training methods will be evaluated in detail to assess if the measure was successful. Therefore, the four-level evaluation model from Kirkpatrick (1979) will be applied (i.e., reaction, learning, behavior, results). More information on the evaluation model for the two studies can be found in chapter 2.4.2.

To conclude, the goals of the research study are threefold: 1) Comparing the two training methods (gamified online training and classroom training) in terms of effectiveness, 2) examining the longevity of the psychological capital interventions (PCI) using a two-month follow-up measure (see study 2); and (3) comprehensively evaluating the PsyCap trainings in terms of acceptance and effectiveness. The thesis will not only shed light on performing a PCI including gamification techniques, which has not been done before, but also provides a detailed evaluation of the two conducted PsyCap interventions. Findings from the studies will also hold implications for further research and practice, allowing for a better understanding of positivity in general and PsyCap in particular in the workplace. The next chapter illustrates the different methods utilized in both studies of the present thesis.

Chapter 2 : Methods

This chapter presents the methods of the empirical studies' implementation. First, the study samples and research design are described (chapter 2.1), then the study procedures (chapter 2.2) are introduced, and finally, the questionnaires (chapter 2.3) and the evaluation of the conducted studies (chapter 2.4) are explained.

2.1 Study Samples and Research Design

A multinational software corporation that develops enterprise software to conduct business operations and customer relations is the focus of both studies. The main objective of the corporation is to enable businesses of all sizes and in all industries to perform profitably, adapt continuously, and accomplish strategic goals. The company is characterized by a flexible corporate structure. This includes, among other things, working from home, flexible working hours, and the possibility of working at another location for a long-term period. The employees are from a large number of different countries of origin and nationalities worldwide. The two studies were carried out in this company because there was a need to find a corporation with a heterogenous employee structure as well as a company large enough to have established company-wide processes and standards. In addition, larger companies usually have made significant investments for training and further education. Oftentimes in small companies, due to the limited number of employees and the lack of suitable resources, less time is devoted to further education and training (Batalla-Busquets & Martínez-Argüelles, 2014; Castany, 2010). It therefore made sense to select a large corporation for the studies. A further consideration was to focus on a company in the IT industry as that there is already a high affinity for IT topics and virtual tools like those used in gamification. As the success of a company increasingly depends on the employees to develop innovative ideas, products, and services, it also made sense to investigate the employees in the development area of the company. The employees in this area often experience heavy workloads and are under high pressure. While on the one hand there are shorter development cycles, on the other hand there is a high degree of product complexity to integrate these products into the portfolio that places high demands and stress on the developers.

The two studies are quasi-experiments which took place in 'real-work settings' of the multinational software corporation. The samples of the research participants presented in this thesis consisted of three independent samples (experimental group 1, EG 1; experimental group 2, EG 2; and control group (CG) and comprise employees within the development organization of the investigated company. While there is only one control group, this group was divided into two subcategories: CG 1 (the control group completing two measurement points) and CG 2 (the control group that filled out three measurement points). For the purpose of comparison EG 1 was compared with CG 1, while EG 2 was compared with CG 2 for reasons that will be explained in the relevant chapters. Without a control group, a confounding of the intervention effect with the effect of other occurring factors cannot be ruled out and, in the worst case, the effect is erroneously attributed to the intervention (Hager, Patry, & Brezing, 2000). In study 1, the PsyCap gamified online training was conducted utilizing a sample of employees from a broad spectrum of different development job functions within the entire organization. The invitation text for the

experimental group 1 is shown in Appendix A. In study 2, a sample of employees who worked for the company in different regions in Germany was used in the PsyCap classroom trainings. The invitation text for the experimental group 2 can be found in Appendix I. The last sample addresses the control groups 1 and 2 which included individuals from another organization within the company. The employees of both control groups belong to the functional area of development within the company and had the most overlap with the development organization for job roles (i.e., they had similar tasks and job profiles. The invitation text for the control group 1 and 2 is shown in Appendix I. Overall, the target group (for EG 1 and EG 2) was the 14,877 members of the development group of the company. The studies were marketed to this group via internal communications channels (e.g., blog posts, e-mail distribution lists) in the form of encouraging participation and to create awareness for the PsyCap trainings. Table 2-1 illustrates the number of participants and the respective response rates for each group.

Table 2-1

Number of Participants and Response Rates (in %) of all Groups

	Experimental group 1 (EG 1)	Experimental group 2 (EG 2)	Control groups (CG)	All respondents
T0: Employee reach	1,043 blog post views (14,877 group members)	952 blog post views (14,877 group members)	1,205 e-mail recipients via distribution list	3,200 (16,082 members)
T1: Pre-test	261 (1.8%)	113 (0.08%)	219 (18%)	593 (3.7%)
T2: Post-test	57 (22%)	93 (82%)	CG 1: 57 (26%)	207 (35%)
T3: Follow-up	0	83 (73%)	CG 2: 38 (17%)	121 (20%)

Note. The percentages given in brackets correspond to the respective response rates of the participants from the different groups for the online survey

The experimental group 1 (EG 1) belonged to the gamified online training *HERO of the Jungle*, whereas the experimental group 2 (EG 2) corresponded to the classroom training *Personal Resource Development* (PRD). For EG 1, there were 1,043 blog post views and for EG 2, there were 952 blog post views. Each click on the blog post led to a view of the blog post. However, it was possible for employees to click more than once. This means that the number of views of the blog post cannot be attributed to the number of employees (i.e., unique users). Furthermore, the control groups 1 and 2 were approached by e-mail via a development group distribution list that contained 1,205 e-mail recipients. In total, 593 people out of the 16,082 members (response rate: 3.7%) took part in the online survey at T1 (Pre-test), 207 individuals completed the questionnaire at T2 (Post-test), and 121 employees filled in the survey at T3 (Follow-up). At the first measurement point (T1) 261 participants from EG 1, 113 participants from EG 2 and 219 participants from the control groups 1 and 2 (CG 1 and CG 2) completed

the online survey. After removing the incomplete questionnaires[1], 57 paired questionnaires in EG 1 and CG 1 as well as 93 paired questionnaires in EG 2 remained at the second measurement point (T_2). In addition, 83 paired questionnaires from EG 2 and 38 paired questionnaires from CG 2 for T3 were included in the analysis. At the second measurement date, the response rate for EG 1 was 22%, for EG 2 82%, and for CG 1 26%. At T3, the response rate for EG 2 was 73% and 17% for CG 2. No data for EG 1 was available at the third measurement point due to technical difficulties in the gamified online training. Therefore, the questionnaire acquisition for T3 was no longer pursued. More details on the technical difficulties are discussed in chapter 3.3.5.

A detailed analysis of the drop-outs for all variables (i.e., psychological capital, job satisfaction, work engagement, organizational commitment) from each group at the respective measurement points is shown in Appendix L. In study 1, t-test showed that drop-outs from EG 1 did not differ significantly from the rest of the participants in the measured variables at T1, except that drop-outs showed higher levels of organizational commitment ($t(259) = 4.82$; $p = .00$). Furthermore, drop-outs from CG 1 did not differ significantly from the rest of the control group in the measured variables at T1, except that drop-outs showed higher values in work engagement ($t(232) = 2.07$; $p = .04$). In study 2, t-test revealed that drop-outs from EG 2 did not differ significantly from the rest of the participants in the measured variables at T1. Moreover, drop-outs from CG 2 did not differ significantly from the rest of the control group in the measured variables at T2, except that drop-outs showed lower values in PsyCap ($t(55) = -2.23$; $p = .03$).

To allow conclusions to be drawn about the effectiveness of the PsyCap training, pre- and post-measurements were necessary. In the context of the evaluation of personnel development measures (see chapter 2.4.2 for further details), an experimental study design is usually not possible (Sattler & Sonntag, 2016). Therefore, the implementation of an ideal-typical pre-post-follow-up design with at least two comparison or control groups is rare (Noe, 2013). However, according to Bortz and Döring (2016) there are numerous quasi-experimental procedures available to draw conclusions on the effectiveness of training interventions.

Figure 2-1 below shows the research design of the thesis indicating the four distinct groups of investigation (EG 1, EG 2, CG 1, CG 2) as well as the different measurement points (T1, T2, T3) and the respective treatment.

[1] Only participants who had answered the questionnaire at both T1 and T2 (study 1) and additionally also at T3 (study 2) were included in the studies.

	Experimental Group 1 (EG 1)	Control Group 1 (CG 1)	Experimental Group 2 (EG 2)	Control Group 2 (CG 2)
Pretest (T1)	✓	✓	✓	✓
Treatment	Gamified Online Training	No Training	Classroom Training	No Training
Posttest (T2)	✓	✓	✓	✓
Follow-up (T3)			✓	✓

Note. The light blue area shows study 1 and the light orange area shows study 2 of the doctoral thesis.

Figure 2-1. Research Design of Thesis: Four distinct Groups of Investigation (EG 1, EG 2, CG 1, CG 2) at the different Measurement Points (T1, T2, T3) with the respective Treatment.

Study 1 used a pretest-posttest control group experimental design as did study 2. Study 2 also included an additional follow-up measure after two months to determine the effectiveness of the PsyCap training over time. To determine whether potential gains in PsyCap persist over time, or to identify long-term effects that may have remained hidden in the post-measurement, it is necessary to conduct follow-up measurements. The participants from study 1 were asked to fill in an online survey at two different measurement points while those in study 2 were asked to complete the online survey at three distinct measurement points: before the training (T1), directly after (T2), and two months after their participation in the training (T3). Additionally, they were asked to provide an 8-digit random identification code used for aligning pre-, post-, and follow-up measures (see Appendix B). It was verified that in all three groups each code only occurred once to ensure that no respondent was duplicated in the three different groups of investigation. The survey data of the control groups, which only completed the online questionnaire at two or three different test points, were measured within the time frame of the two conducted studies. PsyCap as well as further variables such as work engagement (WE), job satisfaction (JS), and organizational commitment (OC) were assessed at the different measurement points. Following the posttest, the participants from the two experimental groups had the opportunity to give feedback on the PsyCap intervention in the form of open questions (see Appendix B, Evaluation). Additionally, socio-demographic data (i.e., age, gender, education, employment status, work tenure, and work region) were also queried in all groups. Since demographic data are often controlled in PsyCap studies (Avey, 2014; Lizar et al., 2015) they were controlled in this thesis as well. Specifically, age, gender, and education were included as covariates in the analysis for all results. To emphasize, no performance parameters of the employees were examined in this thesis. The proximal outcome of the two studies focused on enhancing participant's PsyCap with the four components of hope, self-efficacy, resilience, and optimism. The distal outcomes concentrated on having a desirable impact on attitudinal and behavioral outcomes for the individual and herewith for the organization. More specifically, the distal outcomes in

this thesis focused on work engagement, job satisfaction, and organizational commitment (see chapter 2.3).

2.2 Study Procedures

To carry out the studies, the internal data protection department and the works council of the corporation had to be informed about the planned project and both had to approve these measures. Since the company cannot be named for reasons of data protection law, the sources that could reveal the identity of the company are not cited. The internal survey management service of the company built the online survey after having received the content of the training. The online survey was created in English due to the internal language policies of this multinational company. After having received links to the online survey, the doctoral candidate sent them to the respective target groups (EG 1, EG 2, or CG) at the distinct measurement points. A second survey was created at the end of the online survey to be able to contact the participants for T2 and T3 in which only the e-mail address of the participants was queried. The results from the questionnaire and the e-mail addresses were separated and could therefore not be linked to one another. The required time to complete the online questionnaire was approximately 15 minutes with a total of 68 items with the socio-demographic information already included. Furthermore, the survey management service of the company provided IT support for the web-based surveys during the data collection phase. Finally, the online survey was approved by the works council and complied with the data protection regulations. To gain a better understanding of the chronology of the two studies, a timeline is shown in Figure 2-2.

Figure 2-2. Overview of Timeline for Gamified Online and Classroom Training.

Study 1 was run in 2018 and dealt with the gamified online training *HERO of the Jungle*. The gamified online platform was available to the target group for a period of 5 months. During this time, the participants were able to access the platform with an URL-link after having completed the online survey at T1. They could access the platform at any time and carry out the PsyCap intervention themselves. For any questions during the period of the gamified online training, the participants were able to reach out to the doctoral candidate directly. Internal employees within the development organization programmed the gamified online training and the doctoral candidate was allowed to use the online platform for the study. Before the gamified online training *HERO of the Jungle* was rolled out, five employees within the target group's organization tested it. The testers checked if all the videos, articles, infographics, and word documents were accessible on the platform. They tested if the player gets the correct experience points (XP) and if the XP appeared in the feeds section. After having completely played the gamified online training, the testers also checked if the users receive the announcement of completion at the end. Additionally, the testers were instructed to also give feedback if there were unclear steps or actions that they had noticed. In general, the testers liked the gamified online training approach, especially the competitive part of it. They reported some technical issues in the gamified training and one tester reported that he found it hard to pass some of the content-related quiz questions. Based on the feedback from the testers of the gamified online training, the issues were fixed. The doctoral candidate identified the target group by having posted various blog posts on an internal social collaboration platform within the development organization (see Appendix A, Invitation text). Interested participants were able to open the online survey by clicking on a link in the blog post, and then accessing the gamified online platform with another link after having completed the survey. One week after having completed the online survey and having attended the gamified online training platform for the first time, the participants received a personalized e-mail. They were asked if they needed assistance, for example in opening a chapter or getting to the next chapter. The doctoral candidate also offered the participants to arrange a call, in case they had any questions or were not able to continue the learning program. Additionally, an announcement was put on the gamified online platform to inform them how to open a new chapter and to click the "DONE" button once they finished a chapter. Furthermore, a note was given to the user to always open the URL (i.e., the link to open the *HERO of the Jungle* training) in Google Chrome to have full access. All in all, the participants could play through the gamified online training independently.

In study 2 the doctoral candidate conducted nine classroom trainings on *Personal Resource Development*, which was the second PsyCap intervention (PCI) of this thesis. They were held in two phases in 2019. The first phase took place May-June in which the doctoral candidate facilitated five classes, and the second phase took place in August-September in which the doctoral candidate held four classes. The doctoral candidate had support from a colleague in preparing the classroom trainings. They were held in German and English at different locations throughout Germany and were marketed through blog posts to the development organization in this study as well. The participants were able to register for the classroom training by opening a dedicated webpage, which provided further information about the training content, dates and location. Registered members were sent an e-mail reminder one

week before the training requesting the participant to fill in the survey before the start of the PRD workshop. The maximum number of seats for each course was limited to 20.

2.3 Description of the Measuring Instruments

The investigation method of the two studies contained quantitative and qualitative online survey self-report data at the individual-level of analysis. Table 2-2 presents an overview of the scales used in the studies indicating the variable, source of the respective questionnaire, and the number of items. Specific details about the psychometrics of each of the scales are reported in the respective chapter.

Table 2-2

Overview of the Scales Used in the Two Empirical Studies

Variable	**Source Questionnaire**	**Number of Items**
PsyCap	PCQ; Luthans, Youssef, and Avolio (2007c)	24
Work Engagement	UWES; Schaufeli and Bakker (2003)	17
Job Satisfaction	Warr et al. (1979)	3
Organizational Commitment	TCM; Allen and Meyer (1990)	18
Socio-demographic Information	Own development	6
Total items		68

In both studies, already existing and validated scales were used to measure the construct of interest. The reason for having chosen work engagement, job satisfaction, and organizational commitment as outcome indicators of the PsyCap intervention is because they are the most common and essential work-related attitudes and behaviors (Avey et al., 2011). Since the studies were mainly affected by the assessment of psychological perceptions (i.e., PsyCap) and other self-referential constructs (i.e., job satisfaction, work engagement and organizational commitment), a self-report, survey-based methodology was considered appropriate. This is reflected in the current PsyCap research, which has solely relied on versions of the self-report, namely the PsyCap Questionnaire (PCQ, Luthans, Youssef, & Avolio, 2007c). Compared to other methods, such as telephone or face-to-face interviews, this approach is more efficient and economical by providing access to a larger number of potential participants (Bernard, 2013). However, potential disadvantages of this approach may be social desirability and respondent mood states when filling out the questionnaire (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

At the beginning of each survey (see Appendix B), a disclaimer was used to inform the participants that it was an anonymous questionnaire and neither the employees' ID nor e-mail address would be recorded with the survey. To guarantee anonymity but nevertheless being able to make individual/group statements, the respondents were asked to fill in a 8-digit code consisting of a) the first two letters of the mother's first name, b) the first two letters of the father's first name, c) the month of birth as number (e.g., 03 for March), and d) the first two letters of the place of birth. For the socio-demographic

information, six questions were queried. The questions addressed the work region, gender, age, education, current employment status, and tenure of work. If the participants did not like to give any information on this matter, they were able to answer each socio-demographic question with 'N.A. - No answer. All other questions were mandatory. In case the participants forgot to answer a question, they were informed through a notification to complete the question. With regard to the PRD workshops, the participants of the experimental group 2 received an additional question that asked for the date of workshop. Since the everyday language in the company is English, all questionnaires used this language. In the following section, the questionnaires used in the two experimental studies are described in more detail.

2.3.1 Psychological Capital

Since its introduction in 2004, the PsyCap construct has been assessed using the PCQ as a standard measure. So far, the PCQ was used in more than 14 countries and languages, along with minor changes to the scale to suit the needs of the respective target groups (Luthans et al., 2015). The domain-specific measure itself is linked to the workplace, although studies show associations with psychological constructs that are equally important for students, the unemployed, and retirees (Baron et al., 2013). In this thesis, PsyCap was measured by the Psychological Capital Questionnaire 24 (PCQ-24) developed by Luthans, Avolio et al. (2007). The PCQ was selected for the two studies because it is the most frequently used instrument in the PsyCap literature. Although the shorter 12-item version of the PCQ was also developed by having psychometrically selected the items (Avey et al., 2011), and has been successfully used over the years (e.g. Avey et al., 2011; Baron et al., 2013; Huang & Luthans, 2014; Norman, Avolio, & Luthans, 2010), it seemed reasonable in the context of this study to use the more comprehensive version of the PCQ for the two studies. This choice was due to the fact that shorter versions of scales are not necessarily as reliable (Luthans et al., 2015). Example items of the PCQ-24 include: "I feel confident helping to set targets/goals in my work area" (self-efficacy); "I can think of many ways to reach my current work goals" (hope); "I can get through difficult times at work because I've experienced difficulty before" (resilience); and "When things are uncertain for me at work, I usually expect the best" (optimism). The final score of the PCQ represents an individual's level of positive PsyCap (Luthans, Avolio et al., 2007). A higher score indicates more positive PsyCap within a person. The permission to use the PsyCap measurement for research purposes is available free of charge and was obtained through the www.mindgarden.com permission process. The following section briefly describes the original scales of the PCQ.

Hope. The State Hope Scale by Snyder et al. (1996) consists of three agency and three pathways statements. Respondents answer the items with regard to how they are "right now". A wide range of studies promote the internal reliability as well as convergent and discriminant validity of the State Hope Scale (Feldman & Snyder, 2000; Snyder et al., 1996). Cronbach's alpha for the overall State Hope Scale was .88, the alpha for the agency subscale was .86 and for the pathway subscale .59 and both subscales correlated .82 (Snyder et al., 1996).

Self-efficacy. Parker's (1998) self-efficacy instrument utilizes a Likert scale relevant to the workplace where respondents are asked to rate how confident they feel if they were asked to carry out a set of

tasks such as ‘analyzing a long-term problem to find a solution’ or ‘helping to set targets/goals in their work area’. It is worth mentioning that the set of tasks was not intended to be comprehensive, but rather represent meaningful exemplary elements of an role that applies across jobs and hierarchical levels (Parker, 1998). This approach is in line with Gist’s (1987) proposal that by aggregating self-efficacy scores across performance competencies a more generalized self-efficacy measure could be constructed. People’s belief in their ability to carry out this certain task was of interest in this matter, not whether they had actually performed such a task (Parker, 1998). Cronbach’s alpha was .96 (Parker, 1998).

Resilience. The items on resilience in the PCQ stem from the 25-item Resilience Scale (RS) to detect the degree of individual resilience seen as a positive personality component that boosts individual adaptation (Wagnild & Young, 1993). The RS supports the internal consistency and test-retest reliabilities as well as construct and concurrent validity (Wagnild & Young, 1993). The internal consistency reliability coefficient was .89 in Wagnild and Young's (1993) sample.

Optimism. Scheier and Carvers’ (1985) Life Orientation Test (LOT) measures dispositional optimism, defined as a person’s generalized outcome expectancy. Four of the eight items are indicating a positive direction (e.g., ‘In uncertain times, I usually expect the best.’) and four items are expressing a negative direction (e.g., ‘If something can go wrong for me, it will.’). The LOT possesses an adequate level of internal consistency, test-retest reliability, as well as convergent and discriminant validity (Scheier & Carver, 1985). Cronbach’s alpha for the eight-item scale was .76 (Scheier & Carver, 1985). For the items that measure optimism in the PCQ-24, all four items from the LOT that indicated a positive direction and two items that indicated a negative direction were selected.

2.3.2 Work Engagement

Schaufeli, Salanova, González-Romá, and Bakker (2002) define engagement as a ‘positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption. Rather than a momentary and specific state, engagement refers to a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behavior. Vigor is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one’s work, and persistence even in the face of difficulties. Dedication refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption is characterized by being fully concentrated and happily engrossed in one’s work, whereby time passes quickly, and one has difficulties with detaching oneself from work’ (p. 74). Thus, people who are engaged at work have a high amount of energy and are highly identified with their work. Validity studies illustrate a negative relationship between work engagement and burnout. In addition, engagement can be contrasted with workaholism and working excessively long hours (Schaufeli & Bakker, 2003).

In order to measure work engagement, the Utrecht Work Engagement Scale (UWES) was developed (Schaufeli & Bakker, 2003). It consists of 17 statements using a 7-point Likert scale ranging from 0 (never) to 6 (always). Scores range between a minimum of zero and a maximum of 102 points in the UWES. Work engagement was measured by means of the three item scales: Vigor (VI, six items),

Dedication (DE, five items), and Absorption (AB, six items). Sample items include “At my work, I feel bursting with energy” (Vigor), “I am enthusiastic about my job” (Dedication), and “I get carried away when I’m working” (Absorption). Vigor is determined by six items signifying high energy levels, resilience, the willingness to perform, not being easily exhausted, and perseverance in the face of difficulties (Schaufeli & Bakker, 2003). People with a high score on vigor tend to have a lot of energy, zest, and endurance whereas those with a low score on vigor tend to have less energy, zest, and endurance while working. Dedication is measured by five statements representing some kind of meaning from the person’s work, feeling excited and proud of one’s job, and feeling stimulated and challenged by it (Schaufeli & Bakker, 2003). People with a high score on dedication powerfully identify with their work as it is regarded as purposeful, inspiring, and associated with challenges. In addition, dedicated people feel excited and proud about their work. Individuals who score low on dedication do not feel identified with their work because a sense of purpose, inspiration, or challenge is missing. Furthermore, they neither feel enthusiasm nor pride about their work. Absorption is assessed by six items that consist of being immersed in one’s work and finding it difficult to detach oneself from it (Schaufeli & Bakker, 2003). People who feel absorbed in their job, experience that “time flies” while working and they forget everything else around them. Individuals who score low on absorption do not feel immersed in their work. They neither forget everything around them, nor experience difficulties in detaching from their work responsibilities. According to Schaufeli and Bakker (2003) all three subscales of the UWES show internal consistency and are stable across time. Cronbach’s alpha values for the UWES range between .80 and .90 (Demerouti, Bakker, de Jonge, Janssen, & Schaufeli, 2001; Montgomery, Peeters, Schaufeli, & Ouden, 2003). Cronbach’s alpha for the vigor scale was reported .82, for the dedication scale .89, and for the absorption scale .83 (Schaufeli & Bakker, 2003). In the course of this investigation it was of interest to what extent PsyCap and work engagement are related in general. Therefore, the aggregated UWES scale was chosen.

2.3.3 Job Satisfaction

Job satisfaction (JS) is one of the most frequently measured constructs in industrial/organizational (I/O) psychology due to its individual and organizational conditions and outcomes in the workplace (Dormann & Zapf, 2001). According to Locke (1976) job satisfaction is described as a pleasurable emotional state resulting from appraisal of one’s job or job experience. Luthans (1998) interprets job satisfaction in three ways: as an emotional response, individual expectations about outcomes, and related aspects of work (i.e., pay, promotion, work itself, facilities, nature of work, coworkers etc.). Furthermore, job satisfaction is defined as ‘the degree to which a person reports satisfaction with intrinsic and extrinsic features of the job’ (Warr et al., 1979, p. 133). Warr et al.’s (1979) Job Satisfaction Scale (JSS) is a frequently used measure of job satisfaction in the workplace. In this thesis, job satisfaction was measured in both studies using a three-item scale (Warr et al., 1979) to assess the satisfaction of all individuals with their work, organization, and job. Example items include, “Overall, I am satisfied with the kind of work I do” and “Overall, I am satisfied with my job.” The items were rated on a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. Scores range between a minimum of 3 and a maximum of 15 points. Cronbach’s alpha for this scale was .76 (Warr et al., 1979). Previous studies showed a clear

association between PsyCap and job satisfaction. Several studies demonstrate that people with high levels of PsyCap also show higher satisfaction with their jobs (Avey et al., 2011; Luthans, Avolio et al., 2007; Newman et al., 2014).

2.3.4 Organizational Commitment

Organizational commitment (OC) was determined using the revised version of the Three-Component Model (TCM) of commitment by Meyer, Allen, and Smith (1993). The TCM measures three different kinds of employee commitment to an organization: a) desired-based (affective commitment), b) obligation-based (normative commitment), and c) cost-based (continuance commitment) (Allen & Meyer, 1990). According to the three distinct themes in the definition, commitment is a psychological state that characterizes an employee's relationship with the organization and consists of implications for the decision to continue or discontinue in the organization (Meyer et al., 1993). However, there are differences in the nature of the psychological state for each distinct theme. Employees with a strong affective commitment (high ACS scores) stay with the organization because they want to, those containing a strong continuance commitment (high CCS score) remain because they have to, and those with a strong normative commitment (high NCS scores) stay because they feel they ought to (Meyer et al., 1993). The difference between organizational commitment and job satisfaction is that commitment often refers to an affective affiliation towards an organization, whereas job satisfaction involves more cognitive evaluation of the personal work situation (Six & Felfe, 2004).

Respondents of the TCM are asked to answer statements according to their perception of their relationship with the organization and their reasons for staying. In the revised version of the TCM there are six statements for each scale (ACS, CCS, NCS). A sample item of the ACS is "I would be very happy to spend the rest of my career with this organization." Besides that, a sample item of the CCS reads "It would be very hard for me to leave my organization right, now, even if I wanted to." Finally, a sample item of the NCS is "This organization deserves my loyalty." The items are rated on a 7-point Likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". The participants of this thesis were asked to answer all 18 items (i.e., six items for each ACS, CCS, and NCS scale). In the context of this investigation it was of interest to what extent PsyCap and organizational commitment are related in general. Therefore, no differentiation was made between the individual types of commitment. The next section illustrates the evaluation of the conducted studies including statistical analyzes and the evaluation of personnel development measures.

2.4 Evaluation of the conducted Studies

In the following, a description of the statistical evaluation of the conducted studies (see chapter 2.4.1) and the evaluation of personnel development measures (see chapter 2.4.2) are presented.

2.4.1 Statistical Evaluation

Data were analyzed using the statistic program SPSS in version 22. The samples were described using descriptive statistical methods for the calculation of averages, standard deviations (SD), sample sizes, and percentage frequencies. Reliability analysis was also used to determine the measurement accuracy of a test. It was checked to what extent the individual parts of the test (items) measure the same (Kubinger, 2019). Cronbach's Alpha (α) was used (see chapter 3.3.3 for study 1 and chapter 4.3.2 for study 2) as a measure of internal consistency. According to Bortz and Döring (2016), reliabilities above .90 are considered high, reliabilities between .80 and .90 are considered moderate. Reliabilities between .70 and .80 can be considered just sufficient (Bortz & Döring, 2016). In addition, Chi-square (χ^2) test was used to compare differences in demographic characteristics. Both studies use independent sample t-test to show potential sample differences between the experimental groups and the control groups. The independent sample t-statistics tests a hypothesis on the mean difference between two populations, according to which there is no difference as per the null hypothesis (H_0: $\mu_1 - \mu_2 = 0$), while the alternative hypothesis assumes a mean difference (H_1: $\mu_1 - \mu_2 \neq 0$) (Pospeschill, 2006). According to Pospeschill (2006), the resulting t-value is t-distributed with $n_1 + n_2 - 2$ degrees of freedom for small samples, for larger samples ($n_1 + n_2 \geq 50$) it is approximately normally distributed. The criteria of variance homogeneity as a prerequisite for the t-test must also be checked. The homogeneity of variances was calculated with the Levene's test to test the null hypothesis that the error variance of the dependent variable was the same across groups.

Table 2-3 illustrates the analyzes performed in studies 1 and 2 to test the hypotheses.

Table 2-3

Performed Analyzes in Studies 1 and 2 to test the Hypotheses

Hypothesis	Database		Analyzes
	Group	Time of Measurement	
H1, H1a-1d	EG 1, CG 1	T1, T2	Repeated measures ANCOVA
H2, H3, H4	EG 1, CG 1	T1, T2	Product-moment correlation
H5, H5a-5d	EG 2, CG 2	T1, T2, T3	Repeated measures ANCOVA
H6, H7, H8	EG 2, CG 2	T1, T2, T3	Product-moment correlation

Note. H = Hypothesis; EG = Experimental group; CG = Control group; T1 = Time of measurement 1 (before the training); T2= Time of measurement 2 (directly after the training); T3 = Time of measurement 3 (two months after the Training)

The investigation of the intervention effect was carried out with a repeated measures analysis of covariance (ANCOVA) (hypotheses 1, 1a-1d, 5, 5a-5d) to test whether the experimental groups showed higher values of PsyCap and its corresponding elements both after the intervention measure (T2) and the follow-up eight weeks later (T3, only in study 2) compared to the control groups. Gender, age, and education were included as control variables. Several conditions must be met for this: 1) interval scale

level of the dependent variables; 2) normal distribution of the dependent variables; 3) homogeneity of the variances (Levene's test), and 4) multivariate homogeneity of the covariances (box test). First, interval scale level of the dependent variables was given for both studies. Second, as the normal distribution is a basic requirement in statistics, especially when using t-tests, it is tested with the Kolmogorov-Smirnow test. The Kolmogorov-Smirnow test examines with the null hypothesis whether there is a normal distribution. Ideally the null hypothesis cannot be rejected, i.e., accepted. For a perfectly normal distribution, skewness and kurtosis should be zero. In study 1, the overall PsyCap variable was found to be normally distributed at T1 as well as its components of hope, resilience and optimism. Except self-efficacy was not normally distributed at T1. Self-efficacy scores were high, indicating a right-skewed distribution. At T2, the overall PsyCap, hope, and resilience were normally distributed. Except for self-efficacy and optimism which were not distributed normally. Work engagement, job satisfaction, and organizational commitment were normally distributed at both measurement points. There were no outliers in study 1 and study 2. In study 2 the overall PsyCap variable and optimism were measured to be normally distributed at T1 and T2. Hope, resilience and self-efficacy were not normally distributed at T1 and T2. At T3, only optimism was normally distributed. According to Bortz and Döring (2016) if samples are large enough ($n > 30$), one can generally assume that the sample distributions will approximate a normal distribution. Then violations of this condition are acceptable. Third, the homogeneity of variances was given anytime for the hypothesis 1, hypotheses 1a-1d, hypothesis 5, and hypotheses 5a-5d. Fourth, the box test, which measures equality on covariance matrices, can be ignored if the sample size is the same (Field, 2013). In this case, the box test must be applied in study 2, as we have a different sample size. The result of the box test showed that the covariance matrices are identical. Hence, the prerequisite was fulfilled. In summary, the prerequisites for the calculation of the ANCOVA with repeated measures were fulfilled. The significance level was defined as .05 in the two studies. The effect measure of the analysis of variance is described by the F-value. The calculated F-value is compared with the critical value on the theoretical F-distribution. With a $p = < .05$, the F-value is being considered statistically significant. If statistically significant results are obtained in the analysis of variance, they are examined using the parameter η^2 (Eta-square) to assess their effect. η^2 measures the proportion of explained variance in the dependent variable on the main effects and the interaction effect (Pospeschill, 2006). A value can then be derived from eta-square via the effect strength ε (Pospeschill, 2006). According to Pospeschill (2006) $0 < \varepsilon < .20$ corresponds to a weak effect ($\eta^2 \approx 1\%$), $.20 < \varepsilon < .40$ to a medium effect ($\eta^2 \approx 6\%$) and $\varepsilon > .40$ to a strong effect ($\eta^2 \approx 14\%$).

To calculate the strength of the relationship between two characteristics, it is possible to calculate a product-moment correlation (Pearson correlation) or a rank correlation (Spearman). Depending on the prerequisites (normal distribution and interval scaling), one of the methods was chosen. In the context of this investigation, the product-moment correlation was calculated according to Pearson (see hypotheses 2, 3, 4, 6, 7, 8) since both conditions were fulfilled. Otherwise a rank correlation according to Spearman would be preferable (Rasch & Kubinger, 2006). The product-moment correlation measures the degree and direction of a linear relationship between two variables (Pospeschill, 2006). Zöfel (2003) recommends the following classification for the interpretation of the correlation coefficient r: $|r|<0.20$ is

described as a very low correlation, $0.20 < |r| \geq 0.50$ as a low correlation, $0.50 < |r| \geq 0.70$ as medium correlation, $0.70 < |r| \geq 0.90$ as high correlation and $0.90 < |r| \leq 1$ as a very high correlation.

Additionally, as an excursus, multiple regression analysis was applied (see chapter 3.3.4 for study 1 and chapter 4.3.3 for study 2) to explain a dependent variable (e.g., work engagement, job satisfaction, organizational commitment) with an independent variable (e.g., PsyCap). In other words, it should be examined how large an influencing variable x is on the target variable y. Several requirements must be met for this: 1) normality, 2) linearity, 3) homoscedasticity, and 4) absence of multicollinearity (Ohr, 2010). First, to draw valid conclusions from the regression, the residuals of the regression should follow a normal distribution. The residuals are the error terms, or the differences between the observed value of the dependent variable and the predicted value. By examining a normal Predicted Probability (P-P) plot, it can be determined whether the residuals are normally distributed. If so, they correspond to the diagonal normality line indicated in the diagram. This requirement was met in both studies. Second, linearity means that the predictor variables in the regression have a linear relationship with the outcome variable. If the residuals are normally distributed and homoscedastic, this corresponds to linearity. Hence, this requirement was also met. Third, homoscedasticity refers to whether the residuals are equally distributed or whether they tend to cluster at some values and are widely separated at other values. In the context of t-tests and ANOVAs, this concept is also referred to as equality of variances or homogeneity of variances. This assumption can be checked by plotting the predicted values and the residuals on a scatter plot. As already mentioned, the homogeneity of variances was given anytime for PsyCap and its elements. Furthermore, the homogeneity of variances was also given for work engagement (WE), job satisfaction (JS), and organizational commitment (OC). Fourth, multicollinearity refers to when the predictor variables are highly correlated with one another. This is a problem, because the regression model cannot map the variance in the outcome variable exactly to the correct predictor variable, leading to confused results and incorrect conclusions. This assumption is relevant for a multiple linear regression that has multiple predictor variables as it is the case within both studies of this thesis (i.e., hope, self-efficacy, resilience, and optimism). The absence of multicollinearity was met in both studies. Hence, all requirements were met to conduct multiple regression analysis. When interpreting the variance explanation in the multiple regression analyzes, Cohen (1988) recommends the following classification: $|R^2| = .02$ corresponds to a weak variance explanation, $|R^2| = .13$ to a medium variance explanation, and $|R^2| = .26$ to a strong variance explanation. This classification is used when the results of the multiple regression analyzes are interpreted. In addition to the statistical analyzes described in this chapter, this thesis focuses on the evaluation of the two PsyCap trainings (*HERO of the Jungle* and Personal Resources Development). The next chapter provides information on the general evaluation of personnel development measures in organizations.

2.4.2 Evaluation of Personnel Development Measures

The main objective of an evaluation is to review practical measures, improve them, or decide on their implementation (Wottawa & Thierau, 2003). According to Sattler and Sonntag (2016) the purpose of an evaluation is essential to determine the extent to which a measure contributes to the success and the achievement of an organization's objectives. "Evaluation should not be viewed as a final judgement on the overall worth of a training program but rather as an integral part of a process of continuous improvement" (Quinones & Tonidandel, 2003, p. 241). In general, the evaluation of personnel development measures has a high potential benefit for the different stakeholders involved directly (e.g., training participants, trainer) or indirectly (e.g., supervisors, management) in the intervention (Sonntag, Frieling, & Stegmaier, 2012). For workshop participants an evaluation can serve as learning success or individual feedback, while for trainers, a high potential benefit of the evaluation lies in the feedback on personal teaching success as well as in indications to improve their own training quality (Sattler & Sonntag, 2016). Additionally, supervisors are given the opportunity to assess training activities on the basis of the evaluation results and there is a higher potential benefit for management in providing proof of efficiency that can be used for accounting purposes (Sattler & Sonntag, 2016). With regard to the conducted PsyCap trainings in this thesis, the participants of both experimental groups (i.e., EG 1 for the gamified online training *HERO of the Jungle* and EG 2 for the classroom trainings *Personal Resource Development*) had the opportunity to give feedback regarding the intervention measure after the second measurement. For the evaluation process Kirkpatrick's (1979) four-level evaluation model was applied. The four consecutive levels of evaluation are: 1) The reaction of the trainees and their thoughts about the training; 2) the trainee's learning results and increase in knowledge; 3) the trainee's behavior change after applying the training content on the job; and 4) the results or effects on the business or environment by the trainee. The resulting information from the first two (i.e., study 1) and three levels (i.e., study 2) in consonance with Kirkpatrick (1979) was used to comprehensively evaluate the two conducted studies using self-reported data. Self-reported survey-based research offers various advantages. A structured self-report enables, for example, the confidential collection of perception data from the target group. Furthermore, this approach eliminates the risk of interview bias and preserves the anonymity of the participants (Sarantakos, 2013). Moreover, self-report, survey-based research is more efficient and cost-effective by allowing access to a greater number of potential participants compared to other methods such as face-to-face or telephone interviews, (Bernard, 2013). Nonetheless, this research design also involves the risk of common method variance (CMV), which affects the validity of the results. Even though there is debate concerning the impact CMV has on results, some argue that the issue is overrated (Lance & Vandenberg, 2009; Spector, 2006).

Table 2-4 displays the questions asked and levels from Kirkpatrick (1979) to evaluate both PsyCap trainings.

Table 2-4

Levels of Evaluation according to Kirkpatrick (1979)

Levels from Kirkpatrick (1979)	Closed and open evaluation questions	Study 1: Gamified Online Training *HERO of the Jungle*	Study 2: Classroom Training *Personal Resource Development*
Level 1: Reaction	I would recommend the gamified online training / classroom training to a friend or colleague.	✓	✓
	There was a good balance between theoretical and practical learning activities.	✓	✓
	The exercises were well suited to convey the content.	✓	✓
	I liked the format and design of the gamified online training.	✓	x
	The trainer was proficient.	x	✓
	The trainer delivered the content in a knowledgeable and engaging way.	x	✓
	What did you like most about the gamified online training / classroom training?	✓	✓
	What suggestions for improvement do you have?	✓	✓
	In case you did not reach the target (≥250 XP), what was the reason?	✓	x
Level 2: Learning	I will be able to apply what I have learned to my job.	✓	✓
	What exactly did you learn in the gamified online training / classroom training?	✓	✓
	Do you remember especially interesting/exciting videos/ tasks/ quizzes? If so, why do you remember them?	✓	✓
Level 3: Behavior	I applied the learning content from the workshop in my job.	x	✓
	I experienced a noticeable positive change in my behavior back on the job.	x	✓
Level 4: Results	/	/	/

First, the reactions of the individuals on the PsyCap trainings were queried by asking if they would recommend the gamified online training or classroom training to a friend or colleague. In particular, if they liked the balance between theoretical and practical learning activities and if the exercises were well suited to convey the content. Additionally, the participants from the first study were asked if they liked the format and design of the gamified online training. Besides that, the members of the classroom training were asked to give feedback if they found the trainer proficient and if the trainer delivered the content in a well-informed and appealing way. Concerning the employee's thoughts on the respective PsyCap training within the first level of evaluation, they were asked open questions in terms of what they liked most about the gamified online training or classroom training, what suggestions for improvement they have, and finally, for the participants of study 1, what the reasons where in case they did not complete the PsyCap training by obtaining at least 250 XP.

Furthermore, the learning results were measured by asking if the participants will be able to apply what they have learned to their jobs, what exactly they learned in the gamified online training or classroom training, and if they remembered especially interesting or exciting videos, tasks or quizzes, and why they remembered them. The increase in knowledge about the four PsyCap elements in each course was queried with the second (and third) online questionnaire for calculating the respective PsyCap mean values and overall PsyCap. Third, the participant's behavioral change after having applied the learning content to their job was only measured in the second study by asking them if they had applied what they had learned and if they had experienced a noticeable positive change in their behavior in their daily work life. Fourth, the results and effects on the business itself could not be measured, because the company data was handled as strictly confidential under data protection regulations. Nevertheless, the development and increase of participants' PsyCap is likely to have a positive financial impact for companies. In order to demonstrate the effectiveness of the PCI, utility analyzes in the past have estimated an enormous return on investment of over 200% (Luthans, Youssef, & Avolio, 2007c). Consequently, investing in PsyCap development is likely to result in a high return on investment, which is extremely important for businesses.

After having introduced the research literature on positive organizational behavior (POB) in general and psychological capital (PsyCap) in particular (chapter 1) as well as the methods (chapter 2), the next chapter describes the first study gamified online training *HERO of the Jungle* in more detail.

Chapter 3 : Study 1 - Gamified Online Training *HERO of the Jungle*

This chapter describes the first study of this thesis, the gamified online training *HERO of the Jungle* which was carried out in the development organization of the software corporation. The chapter starts with a short introduction (see chapter 3.1) followed by the illustration of the method that includes the gamified online training structure and PsyCap development (see chapter 3.2). The results are then presented (see chapter 3.3) and at the end are discussed in detail (see chapter 3.4).

3.1 Introduction

Learning and further training are critical for the success of the company under investigation. With the advancing digitalization and interconnectedness of the world, the market of software manufacturers and cloud providers is increasingly competitive. To achieve success, global corporations in particular must ensure that they remain agile and innovative (Denning, 2019). The investigated company trains several thousand employees worldwide to prepare them to cope with daily work issues. Even if time is available, learning is not necessarily one of the tasks that people like to dedicate themselves to nor that have a top priority in their minds. In addition, especially in big companies it is difficult to find a training time suitable for all employees. When employees have escalations at work but are required to attend intervention workshops due to pressure from human resource managers, there is a risk that they will be absent or participate half-heartedly, which counteracts the impact of the intervention (Da et al., 2020). The question is how can employees be motivated to voluntarily invest in further training opportunities in addition to their heavy daily workload? To solve this issue, the company's gamified online training platform offers an opportunity to motivate employees to continuously invest time in learning and further training. Accordingly, online self-learning seems like a promising method to replace centralized workshops to conduct PsyCap interventions in organizations. By acquiring a positive psychological skillset, the employees can maintain a high productivity, be engaged, and satisfied at work and stay committed to their organization (Avey et al., 2011). Gamification, the use of playful elements in business software, can be a promising approach to promote positivity in the workplace and more precisely positive psychological resources. Studies show that many corporations have started to establish 'gamified' processes in different contexts, such as training, idea generation, and communication (Hamari et al., 2014). Gamification “provides a very different approach to creating a supportive environment that can boost people’s motivation, ability, and psychological capital and thus their attempt to change behavior” (Kinley & Ben-Hur, 2015, p. 154). To date, research on PsyCap has not undertaken an empirical investigation of combining psychological capital interventions (PCIs) with gamification elements (Luthans & Youssef-Morgan, 2017). In the context of this thesis it is therefore intended to investigate how the participation in an innovative gamified online training will affect the psychological capital of individuals before and after the training in contrast to the members of the control group 1 who did not receive a training. The gamified online training *HERO of the Jungle* is an innovative approach that strengthens positive psychological resources and combines it with gamified elements to enhance an employee’s personal growth and workplace success. It is a gamification training that focuses on the

enhancement of PsyCap and is not a serious game. The gamified online platform is an internal education format from the investigated company to increase knowledge and skills in the course attendees. It is available worldwide to give the employees in the development organization the opportunity to acquire new knowledge in and develop positive psychological resources (i.e., hope, self-efficacy, resilience, and optimism) without relying on classroom trainings. Moreover, the intervention time can be divided into particular days to allow employees to independently choose an appropriate schedule (Da et al., 2020).The next chapter describes the method of the gamified *HERO of the Jungle* training in more detail.

3.2 Method

The gamified online training was made available for employees from different regions within the development organization of the company. It was relevant to those employees who were interested in personal development. More specifically, the gamified learning offer was about developing employees' PsyCap by focusing on enhancing the respective elements of hope, self-efficacy, resilience, and optimism in the workplace, individually or as a team. The doctoral candidate created several blog posts in the internal social network of the development organization to make employees aware of the gamified online training (see chapter 2.1 for more details). The invitation text (i.e., blog post) for the gamified online training *HERO of the Jungle* is shown in Appendix A. Overall, there was a potential reach of 14,877 members in the internal social network and 1.043 blog post views for the experimental group 1 (EG 1) were recorded. As mentioned earlier, each click on the blog post led to a view of the blog post. That means that the number of views of the blog post cannot be associated to the number of employees. Therefore, it was possible that the employees clicked several times on the blog post to read it. The control group 1 (CG 1) was approached by e-mail via a distribution list (1.205 e-mail recipients) received by the doctoral candidate. The employees from CG 1 were asked if they were interested in participating in an anonymous online survey investigating topics that affect personal growth and workplace success (see Appendix I for the invitation text). The gamified training provided a unique online platform where the PsyCap content was placed. The gamified online platform already existed in the software company and the doctoral candidate was allowed to use it for research purposes. The training was available to the participants for a period of five months. After the participants had completed the online survey, they were given the link to start the HERO online training. This ensured that the members of study 1 first completed the online questionnaire at T1 to determine the initial level of PsyCap as well as work engagement, job satisfaction and organizational commitment. The doctoral candidate received a notification e-mail once a participant completed the online survey from the experimental group 1. The code from the participant in the survey was then matched with the user registration date when that user entered the gamified online training for the first time. This ensured that the participants were registered on the online platform and could go through the training on their own. At the end of the course, the participants received an announcement that they had successfully completed the gamified online training in which a link with the questionnaire for the second measurement point was stored. Not all participants played the gamified online training to the end. Those who did not play through the HERO training received an e-mail from the doctoral candidate after the training period (5 months) was over

asking them to complete the questionnaire a second time (post-survey, T2). As mentioned earlier, no survey data was available at T3 due to technical issues in the gamified online training. Hence the questionnaire acquisition was no longer pursued. More details on the technical difficulties are discussed in chapter 3.3.4. The next section provides the structure of the gamified online course *HERO of the jungle*.

3.2.1 Gamified Online Training Structure

The investigated software company developed their own gamification platform. The platform was previously used for technical content within the development organization and included a different user interface in the form of a world map. The doctoral candidate was allowed to use the gamification platform for her research purposes. The gamified online training platform offers employees a browser-based learning experience with an interface in the design of a jungle, which can be zoomed in and out with the mouse wheel. The user interface of the jungle is illustrated in Figure 3-1.

Figure 3-1. User Interface of Gamified Online Training Platform.

Regarding the architecture, all applications run inside a single instance of the companies' cloud platform. The elements are: The gamified online training frontend (HTML5 application), the gamified online training backend, the administration, an authoring tool, and a company-owned tool to create gamification concepts as rule engine. The software is roughly distributed into the classical three layers of data storage, backend services, and frontend applications. The gamified online training is built to serve four distinct actors: A player, a content author (i.e., the doctoral candidate herself), a course administrator, and a master administrator. For the implementation of the PsyCap learning content onto the online platform, an internal webpage was created. The company's program owner of the gamification platform then transferred the learning content from the webpage onto the gamified online platform. A

total of 12 learning chapters about the four PsyCap elements are stored on the gamified online platform. Each PsyCap element is represented by three different animals. Each animal in the gamified online training consists of a different level of difficulty. There are three levels of difficulty (basic, intermediate, advanced). One animal session takes on average 20 minutes. The time effort for the whole learning consumption on PsyCap is four hours. A more detailed overview of the psychological capital intervention can be found in the next chapter (see Table 3-4). The player can see the score and the received awards in the menu bar on the right side of the window. There, the participant can also detect the current level, rank, and, if applicable, the rank of the team on the leaderboard. Furthermore, activities of other participants in the form of lines between the animals and news in the feed are shown. In the feed section the learner gets a real-time feedback on his actions. The user can also see the own activity, represented by lines between the animals, which serves as a progress parameter as well. At the beginning, the learning path starts with the Tiger, which represents the first hope chapter (Hope part 1 of 3). The further learning path is not specified. This means that the participants can, for example, start and carry out the advanced level before the basic level. The levels do not build on each other thematically, so that strict adherence to the level of difficulty would be necessary. Overall, the PsyCap elements were developed as a whole through the individual exercises in the three different levels of difficulty. The online platform is available 24 hours seven days a week. The participants are able to work self-paced through the content. The learner is entirely free to choose the learning route, content, and the speed of learning. As in other gamified learnings in the investigated organization, participants' failure attempts for example in the quiz questions are not controlled. Only positive actions are considered.

Small colored markers, which are hidden in the eyes of each animal, indicate where to find a learning chapter (see Figure 3-2). To open a learning chapter, the participants need to look at the jungle picture and zoom in with their mouse wheel into the eye of each animal until they see a marker that they can click and press the ‘Go!’-button.

Figure 3-2. Opening a Learning Chapter in Gamified Online Training.

The gamified online training *HERO of the Jungle* combines theoretical with practical learning content and the chapters are always structured in the same way. Figure 3-3 illustrates an overview of the structure of each animal in the gamified training approach. The learning content itself is divided up into learn, practice, quiz, and bonus quiz chapters. There are a total of 13 animals (4 PsyCap elements x 3 levels of difficulty; behind the 13th animal there was no content placed, see Explorer Badge in Table 3-3) on the gamified online training platform. After clicking the "Learn" button, the participants are able to access dedicated YouTube videos, articles, and infographics on the four PsyCap elements to address the theoretical learning part. The exercises for self-reflection can be accessed via the "Practice" button. The learners can download the respective handouts (see Appendix C) as Word documents to work on the tasks. In addition, they are informed that they do not need to submit the individual exercises. These exercises for the self-reflection were adopted by Luthans et al. (2015) and are explained in the next chapter (see 3.2.2). After the practical part, the participants are asked to answer a question in the form of a knowledge quiz. The quiz questions have been specifically developed for the gamified online training and contained topic-specific questions about the four PsyCap elements. Every animal in the HERO training is comprised of one question. Like in other gamified online courses in the company, participants' failure attempts in the quizzes are not measured. Only positive results are considered. The individual quiz questions including the correct answers can be found in the enclosed Appendix D (based on own development).

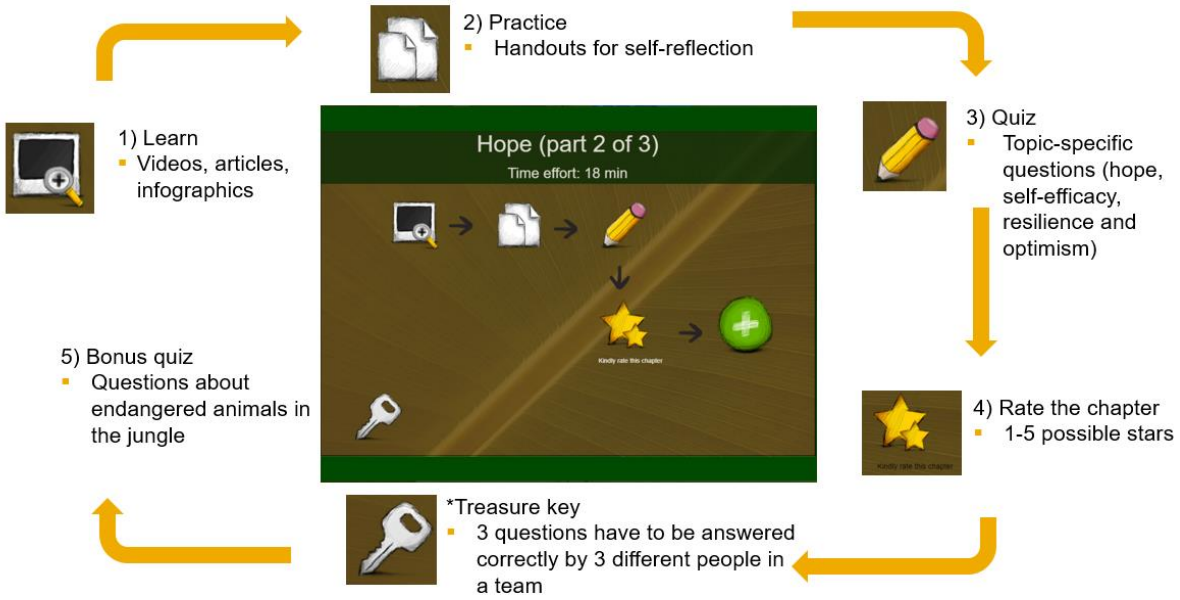


Figure 3-3. Chapter Overview of Gamified Online Training.

Subsequently, there is a brief question after the quiz on how the users like the chapter ('How do you rate this chapter?'). The participants have the opportunity to rate each chapter by giving one to five possible stars for the evaluation of the learning content. One star means that the participants do not like the training content at all, whereas five stars means that they like it a lot. At the end of each chapter there is a bonus quiz with a question about each animal in the jungle, where the participants have the

possibility to collect additional experience points (XP). Hence, the bonus quiz contains no PsyCap content. At first, a little introduction about each animal is given to the participants. Then they have to answer one question about each animal containing four possible answers. The participants have to mark the correct answer. Additionally, there are four treasure keys in the gamified online training. Each treasure key is placed at the intermediate level of each PsyCap element. To receive a treasure key, three questions have to be answered correctly by at least three different people in a team (see Appendix E, based on own development). This task is intended to address the teamwork component in gamified trainings. When participants play in a team, they get more experience points and progress faster in the HERO training (see next section Playing in a team). If a player has successfully completed all stations of a chapter (i.e., learn, practice, quiz, chapter rating, bonus quiz), he/she receives experience points which are also displayed in the live feed.

Gamified Online Training Features

Besides general information about the gamified online training, an internal webpage was created to give further instructions to the participants regarding the technical information (e.g., browser settings, additional equipment), experience points, levels, badges, leaderboard, and playing in a team. These features are explained below.

Technical Information. The participants are given a note to open the URL in Google Chrome to have full access to all of the gamification elements. A recommendation is also to save the training's URL in their browser favorites and add it into their browser's trusted sites. If they notice that the page is not running as expected (e.g., if marked animals are not visible anymore) they are asked to refresh their browser using keyboard shortcut F5. Regarding additional equipment, they are asked to add a monitor and a mouse wheel for best results. The gamified online training is not suitable for smartphones or tablets as it is a desktop version and therefore the respective markers cannot be accessed by a mobile device nor tablet.

Experience points (XP). Experience points are a central gamification element in the gamified online training concept. To reach a higher level, a certain number of points are required. Based upon certain actions, the player receive several experience points (XP). They are used to provide learners with positive feedback about their progress in the course. Table 3-1 shows an overview of the rules for experience points in the gamified online training. The regular completion of the lesson is rewarded with 5 XP. Playing in a team allows the users to earn additional experience points (XP) and badges. If a team completes one animal as first team, each team member receives a total of up to 25 points.[2] The point mechanism in the HERO training is intended primarily to appeal to learners of the achiever type (Bartle, 1996). Players of this type strive to maximize points and levels. However, individual rules also address socializer and explorer. In addition, ranking lists are able to be calculated on the basis of the XP.

[2] The 25 points for the learner result as follows: 5 points for the regular completion of the lesson, 10 points if the learner is the first of all to complete the lesson, 5 points for the team to complete the lesson, 5 points if the team was the first to complete the lesson (I.e., animal).

Table 3-1

Point Table for Learning Progress in Gamified Online Training

Condition	Experience Points (XP)
Learner completes a ‘learn’ chapter	5
Learner completes a ‘practice’ chapter	5
Learner completes a quiz	5
Learner completes a quiz ‘learn’ chapter first of all learners	5
Learner completes a ‘practice’ chapter first of all learners	5
Learner completes a quiz chapter first of all learners	5
Learner completes a lesson (i.e., animal)	5
Learner completes a lesson (i.e., animal) first of all learners	10
The majority of the team completes a lesson	5
The majority of the team completes a lesson as the first team	5

Levels. Depending on the number of collected experience points, the participants are able to reach the following levels: Level 1, the seeker, is reached from zero to 49 XP, level 2, the discoverer, is achieved from 50 to 99 XP, level 3, the adventurer, is attained from 100 to 149 XP, level 4, the conqueror, is reached from 150 to 249 XP and finally, the participants who work through the entire PsyCap content in the gamified training (e.g., finished all 12 animals), and collect at least 250 XP are called *HERO of the Jungle*. In order to reach the seeker level, the participants have to complete up to two animals. For level 2, the players have to finish between three and four animals, for level 3 between five and seven animals, and for level 4 the participants have to play through between eight and 11 animals. Table 3-2 shows the different levels in the gamified online course.

Table 3-2

Levels in Gamified Online Training

Picture	Level	Title	Experience points (XP)
	1	Seeker	0 – 49
	2	Discoverer	50 – 99
	3	Adventurer	100 – 149
	4	Conqueror	150 – 249
	5	HERO of the Jungle	≥ 250

Badges. The participants can receive several badges as a reward for achieving various goals (e.g., uploading a profile photo). With the badges, the participants can collect additional experience points in the gamified online training. The individual badges are placed on the gamified online training platform right under the display of the respective level and the XP. The participants have to move the mouse wheel over a badge to find out what they have to do. An overview of the distinct badges in the gamified training is illustrated in Table 3-3. One badge is called Animal Selfie. To receive this badge, the participants need to create an avatar (i.e., a profile picture) showing themselves in front of an animal of their choice. Another badge is called Women Power. It is given when the participants have at least one woman in their team. The Innovation badge is granted to the players if they deliver new ideas on the PsyCap content. When the learners complete their first bonus quiz they receive the My first animal experience badge. If at least three members of a team complete the same animal, they earn the Welcome Team badge. The Animal Traveler badge is granted to the participants when they visit at least one animal per category (i.e., hope, self-efficacy, resilience, and optimism). The employees receive the Explorer badge when they find the thirteenth animal with no content placed behind the particular animal. Finally, the participants are given the Hall of Fame badge for special actions they perform; this means completing the online survey a second time and providing feedback on the gamified online training experience. With regard to Bartle's (1996) player types, the explorer and achiever are given special attention in the gamified online training.

Table 3-3

Badges in Gamified Online Training

Badge	Title	Description
	Animal Selfie	Create an avatar showing yourself in front of an animal of your choice
	Animal Traveler	Visit at least one animal per category
	Explorer	Find the 13th animal with no content behind its eyes
	Hall of Fame	Enter the Hall of fame for special actions in 2018
	Innovation badge	Deliver new ideas on the content
	My first animal experience	Complete your first bonus quiz
	Welcome Team	Complete the same animal within your team
	Woman Power	Have at least one woman in your team

Leaderboard. Leaderboards are rankings in which the current placement of members is displayed based on a points system. These points are awarded for different executions of actions. Figure 3-4 displays the leaderboard from the gamified online training. The leaderboard is located at the right side of the user interface and shows the individual or team progress (e.g., the (team) name, level, collected badges, experience points etc.). The leaderboard in the gamified online training only displays successes like 'Awesome, you rated a chapter' or 'Tiger Lecture completed. You got 5 XP.'

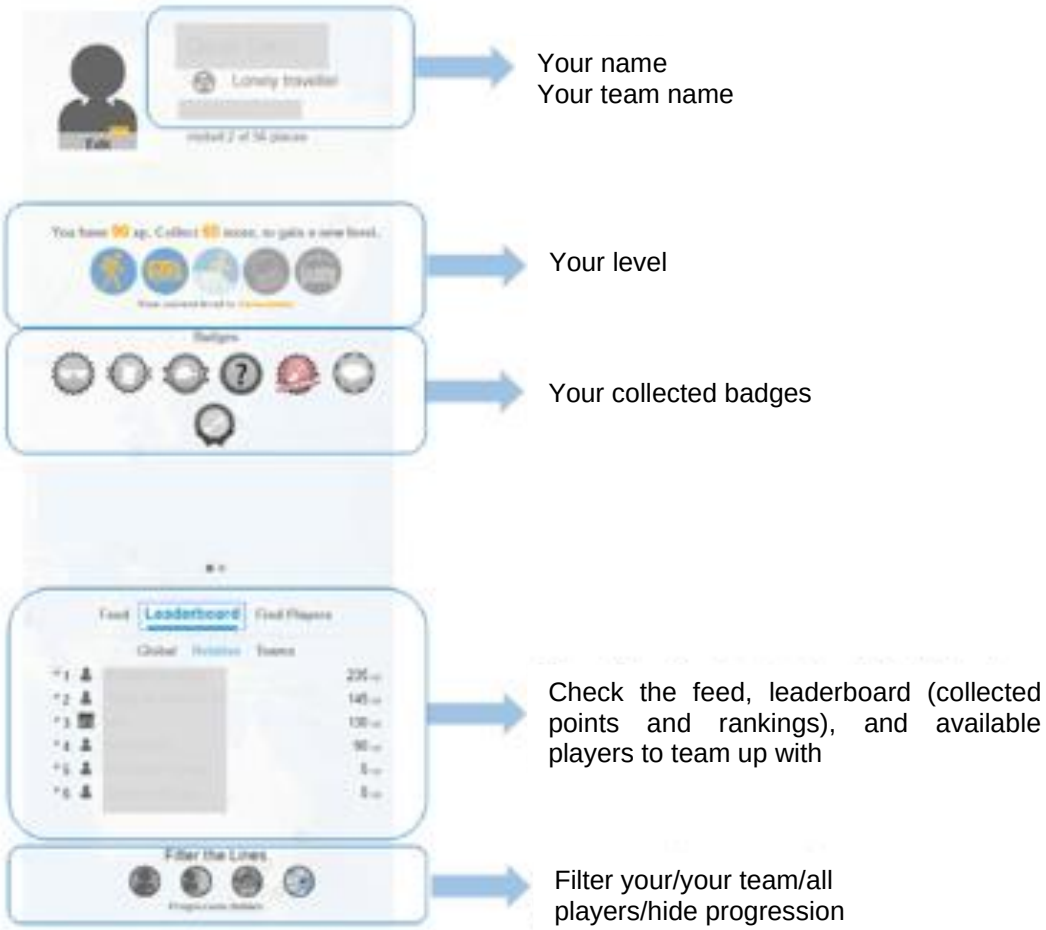


Figure 3-4. Leaderboard in Gamified Online Training.

Playing in a team. The participants are able to either play by themselves or if they like as part of a team. A team usually consists of three to five people. The user who is receiving an invitation is able to either accept or decline it. Anyone can be invited by anyone else. If a player wants to join a team, he or she can get in contact with one of the team members to be invited in the same way. A team is able to create their own team name and profile picture. For this, all team members have to upload the team picture by themselves. If the users like to play the gamified online training anonymously, they are able to edit their profile by inserting a desired name in their profile. The element of team building is intended to create a social component in the gamified online training. Team-oriented and fast learning are clearly emphasized in the gamified online training.

The gamification aspect of the study lies in the implementation of the various gamification elements, such as experience points (XP), levels, badges, leaderboard, quiz questions, and playing in a team. This chapter concludes the gamified online training structure. In the following, PsyCap development is explained in more detail for study 1.

3.2.2 Psychological Capital Development

The PsyCap content of the learn and practice chapters were adapted from Luthans et al. (2015). As already described, there are three different levels for each PsyCap element in the gamified online training: basic, intermediate, and advanced. These three levels do not exist in Luthans et al's PsyCap trainings, they were already preset in the gamified HERO training. The individual levels build on each other. However, it is possible that the participants first completed the advanced level and then the basic level based on the order in which the participants played through each animal. Nevertheless, there was a hint which PsyCap element and which level it was when clicking on the animal (see Figure 3-2). In this respect, it could be assumed that the participants were perhaps looking for the basic levels first. An overview of the modules and their content is given in Table 3-4. The content for the learn chapters is based on the doctoral candidate's own development and the content for the practice chapters (i.e., handouts for self-reflection) is adapted from Luthans et al. (2015). Moreover, the doctoral candidate chose experts and representatives from research and practice for the PsyCap content videos.

Table 3-4

Psychological Capital Intervention (PCI) Model of Gamified Online Training

PsyCap element	Level	Learn	Practice
Hope	Basic	Video Interview with Dr. Shane Lopez (video length 9:40 min)	Delivering definitions of hope and characteristics of hopeful and less hopeful people
			Providing short self-test on hope with emphasis on willpower component of hope
	Intermediate	Video Personal Goal Setting Video (video length 2:07 min) + article Personal Goal Setting (time effort 8 min)	Enabling participants to set SMART work-related goals
	Advanced	Video "Hope Theory - Make Your Life Better" (video length 3:44 min) + infographic hope (time effort 10 min)	Illustrating potential obstacles
Self-efficacy	Basic	Video How to Build Confidence in Your Abilities #1: What Is Self-efficacy? (video length 4:04 Min)	Defining past success at work
			Visualizing successful role models at work
	Intermediate	Video How to Build Confidence in Your Abilities #2: How Self-efficacy Affects Your Life (video length 4:04 Min) + infographic self-efficacy (time effort 10 min)	Listing and prioritizing tasks for specific life domains for being successful
	Advanced	How to Build Confidence in Your Abilities #3: The Experience of Mastery (video length 7:21 min)	Listing and prioritizing tasks for domain of life that always wanted to try or to be better at

Psychological Capital Intervention (PCI) Model of the Gamified Online Training (continued)

Resilience	Basic	Video "What is PSYCHOLOGICAL RESILIENCE? What does PSYCHOLOGICAL RESILIENCE mean?" (video length 2:21 Min) + infographic resilience (time effort 12 min)	Making employees aware of adversity
			Listing coping strategies
			Investigating support network
	Intermediate	Video "How to Be More Resilient" (video length 4:06 min)	Identifying (personal) resources in adverse situations
	Advanced	Video Resilience in the Workplace (video length 5:57 Min) + article 9 Ways to Improve Your Resilience at Work (5 min)	Assisting employees in dealing with setbacks in respect of impact, control, and additional options
Optimism	Basic	Video "Dr. Seligman's Definition of Optimism" (video length 1:59 min)	Delivering definitions of optimism and characteristics of optimistic / pessimistic people
	Intermediate	Video "Learned Optimism Positive Psychology - Martin Seligman - Animated Book Review" (video length 3:51 min) + infographic optimism (time effort 6 min)	Identifying positive events in life by assessing thoughts & feelings incl. circumstances and causes
			Reflecting future-oriented perspective
	Advanced	Video Create Optimism – Thriving at Work and Life (video length 1:16 Min) + article Learned Optimism: The Cup Half Full (time effort 8 min)	Describing past obstacle at work
			Visualizing current situation in relation to selected SMART goal
			Imagining future situation for already attained SMART goal

Note. The corresponding references for the PsyCap content are listed in the video, article, and infographic references (Study 1).

Development of Hope. To start with the development of hope at the basic level, the participants are asked to watch a video about the definition and benefits of hope (UMNCSH, 2013, May 7). The use of hope to achieve personal goals and the difference between hoping and wishing is also mentioned. Additionally, the speaker explains how hopeful people handle obstacles in their life. After having watched the video, the participants are asked to answer two questions in terms of how hopeful people differ from less hopeful people in their thoughts and actions and how hopeful employees think and behave differently than less hopeful employees. A short self-test on hope (see Luthans et al., 2015, p. 80 for further reference) representing the willpower component of hope is also included in the exercise. It contains eight questions (e.g., Are you strong willed?) that have to be answered by the participants. If they answer the questions mostly with “yes”, this indicates the willpower component of hope.

At the intermediate level of the learning section, a short video about personal goal setting (MindToolsVideos, 2014, March 5) is given to the participants. The speaker explains what a goal is, why it is important to set goals and how they can be set. Afterwards, the participants are asked to read an article about personal goal setting (MindTools, 2014, March 5) to better understand the context. The key points of this article are that goal setting is an essential method for achieving one’s aim, distinguishing between what’s relevant and what’s irrelevant, motivating oneself, and developing self-confidence after having achieved one’s goal.

For the advanced level, the participants are expected to watch a video about Hope Theory (Fresno State Kremen School of Education, 2016, December 2). The speaker in the video talks about the components of hope, how learners can develop different pathways and ways to overcome obstacles to reach their goal. Furthermore, an infographic on hope (see happify, 2017, December 28) is presented to the participants in the learning section. After the learners have read the infographic, they are asked to apply what they have just learned in the practical part. The training members are asked to write down a SMART goal they want to work on attaining in the next months. To develop different pathways, the attendees are asked to write down several sub goals to reach their goal. Finally, the participants are expected to write down obstacles that might hold them back from their goals.

Development of Self-efficacy. Starting with the development of self-efficacy, the participants in the basic level learning section are invited to watch a video about how to build confidence in their abilities focusing on what is self-efficacy (ProfoundSelfImprovement, 2017, February 20). This video was chosen to give the participants an introduction into the topic. The personal reflection exercises contain mastery experiences and success, vicarious learning (modeling) and confidence in specific life domains. For the mastery experiences and success exercise, the participants are asked to note down an example from a past success from their work and the reasons for the success. To address vicarious learning (or modeling), the employees are asked to imagine one person within their work domain (colleague, peer, manager etc.) that acts as a successful role model at work. The employees then write down what this role model is doing differently in contrast to other people that are not as successful demonstrating these behaviors and qualities.

At the intermediate level of self-efficacy development in the learning section, a second video about how to build confidence in the participants’ abilities focusing on how self-efficacy affects their life is introduced

(ProfoundSelfImprovement, 2017, February 24). In the video, the participants learn how people with high self-efficacy differ from those with low self-efficacy in their characteristics. Besides that, the speaker introduces four factors affecting self-efficacy. They are, listed in the order of importance, (a) mastery experiences, (b) social modeling, (c) social persuasion, and (d) psychological responses. The second part of the learning section includes an infographic on self-efficacy (see happify, 2015, December 3) that the training members are asked to read through. It focuses on the importance of how people feel about themselves and techniques to boost confidence. The personal reflection exercise for the intermediate level deals with the development of self-efficacy in specific life domains. At the beginning, the participants are asked to choose a specific domain of their life where they feel very confident. This can be related to their job, education, family, friends, hobbies, or a leadership role. Next, they are expected to note different tasks that they need to realize for being successful in this special domain. For example, at work, they may need their communication skills to solve problems and make decisions. Then, the learners are asked to prioritize their list by focusing on the most important three tasks that have the greatest impact on the overall success. The participants are afterwards asked to assess on a scale from 0% to 100% how confident they feel that they a) at least get by on these tasks b) fulfill their own and others' expectations in accomplishing these tasks and c) outperform these tasks.

The advanced level learning chapter contains two videos. One video illustrates the experience of mastery (ProfoundSelfImprovement, 2017, March 28) and the other video deals with social modeling (vicarious experience) (ProfoundSelfImprovement, 2017, March 6). At the beginning of each video, the speaker defines each factor. Afterwards, he describes the importance of the respective element and ways to build it in order to develop self-efficacy. For the last exercise on self-efficacy, the participants are asked to leave their comfort area. They are expected to choose any domain of their life that they have always wanted to try to be better at. The participants are supposed to generalize what they are good at in one domain to the new, yet unexplored domain of their life by applying the same analysis as in the exercise before. First, they note various tasks in this domain to achieve success, then they prioritize them into the most critical three tasks, and finally they answer the same three questions like in the exercise before (i.e., % to get by on the task, % to meet own and others' expectations, % to excel in accomplishing the task).

Development of Resilience. The basic level learning section contains a short video about the definition, effects, and ways to develop psychological resilience (The Audiopedia, 2017, May 7). The second part of the basic level learning chapter on resilience ends with an infographic on resilience (see happify, 2017, March 29). The infographic contains the following aspects: (a) benefits of resilience, (b) strategies to bounce back, and (c) growth from setbacks (at work). For the practice section of resilience in the workplace, one self-reflection exercise focuses on a past event where the participants were confronted with adversity, a conflict, or failure that they believe was overwhelming for them. They are asked to note down the respective event and explain the nature of the event (i.e., if it happened suddenly and unexpectedly, or gradually and emotional challenging). A further task focuses on the coping strategies the participants have used (e.g., keeping a positive attitude, doing sports, playing an instrument) and their effectiveness. The last task in this first self-reflection exercise stresses the support network

available and the question if the participants think they have recovered from this event. These self-reflection exercises are intended to give the participants some insights into their own resilience.

For the learning section on resilience at the intermediate level, a video is shown explaining multiple ways to be more resilient (Hify – The Greatest Minds, 2016, March 18). For example, this can be having a positive outlook, social relationships, facing problems and looking for positive solutions, learning from experiences, or identifying positive role models. The self-reflection exercise at the intermediate level addresses the presence of resources. Participants are asked to imagine an unfavorable event they were recently confronted with. They are expected to think about their applied resources (e.g., their skills, abilities, or social networks) with which they responded to the situation. Additionally, they are asked to identify additional personal resources (e.g., positive outlook, perseverance, ideas from others) they benefited, or could have benefited from to bounce back from the adverse situation.

The learning section in the advanced level of resilience focuses on a video about resilience in the workplace (Niall Kennedy, 2015, March 3). The speaker explains several components of workplace resilience. Those components are social awareness, perspective, social network, optimism, clarity and focus, internal locus of control, and sense of humor. Furthermore, the participants are given an article to read about ways to improve resilience at work (Winbolt, 2016, January 21). This article emphasizes behaviors and actions people can do to strengthen their resilience at work. The practice section in this chapter contains four short tasks. In the first task the employees are supposed to think about an event or situation at work that is not going as well as they hoped and are asked to write it down. The second task deals with their current response to the situation. Here, the participants are expected to describe their feelings and be specific. Afterwards, the learners are asked to frame the issue as something they can or cannot control. Besides that, the HERO training members are supposed to state the real impact of their situation, what the real risk is, who can control the situation and why. The third task addresses additional ways the learners can look at the situation in order to get more control of it and to respond successfully now or in the future when they might face a similar situation.

Development of Optimism. To start with the development of optimism at the basic level, the participants are asked to watch a video with Dr. Martin Seligman about his definition of optimism (see happierdotcom, 2009, October 4). Dr. Seligman delivers characteristics of optimistic and pessimistic people in the video. For the practical exercise afterwards, the learners are asked to note down how optimistic people differ from pessimistic people in their explanatory style, reflect on their own explanatory style, think about specific situations (positive and negative), and reflect on the explanatory styles of others.

For the intermediate learning section on optimism a video is shown explaining ‘learned optimism’ as an animated book review from Seligman’s (2006) book on learned optimism (Practical Psychology, 2016, April 8) followed by an infographic about optimism (see happify, 2017, March 7). Regarding the practical task, the participants are asked to identify positive life events by assessing their thoughts and feelings including the circumstances and causes. Furthermore, they are supposed to think of factors that they could and could not control when the event happened and reflect on future-oriented perspectives.

The learning section in the advanced level of optimism focuses on a video about creating optimism to thrive at work (Live Happy 2017, May 9). Additionally, an article about learned optimism including the message of the well-known statement 'the cup is half full' is given to the participants to read (Moore, 2017, June 7). For developing realistic optimism at work, the participants in the advanced learning part are asked to apply three strategies: 1) leniency for the past (defining one key obstacle/challenge they achieved at work and assess what went well and what did not go well), 2) appreciation for the present (determining the three best things going on with their current situation), and finally 3) opportunity for the future (writing down the desired state or what it is going to feel like, once they've already attained their SMART work-related goal from the previous exercise on hope). This chapter concludes the method of the gamified online training. In the following, the results are explained in more detail.

3.3 Results

The results of study 1 are illustrated in the following sections. At the beginning, socio-demographic information is reported (see 3.3.1) followed by the gamification elements results (see 3.3.2), the descriptive results (see 3.3.3), and the results concerning the examined hypotheses (see 3.3.4). Furthermore, the post-training evaluation is described in chapter 3.3.5. Finally, a summary of the results is made (see 3.3.6).

3.3.1 Socio-demographic Information

Socio-demographic information is reported in this section. There are six socio-demographic questions for the gamified online training. The questions are related to the region in which the participants are working, gender, age, education, current employment status, and the years of employment with the company. Both 57 employees from EG 1 and CG 1 participated in the online survey at T1 and T2. Therefore, the socio-demographic information refers to this group.

Regarding the region in which the participants are working (see Figure 3-5) more than half of EG 1 and 65% from CG 1 are from Germany. The regions EMEA (Europe, Middle East and Africa) North and North America are almost equally distributed in both groups. The rest of the participants are spread across APJ (Asia, Pacific, and Japan), EMEA South, and LAC (Latin and Central America) regions.

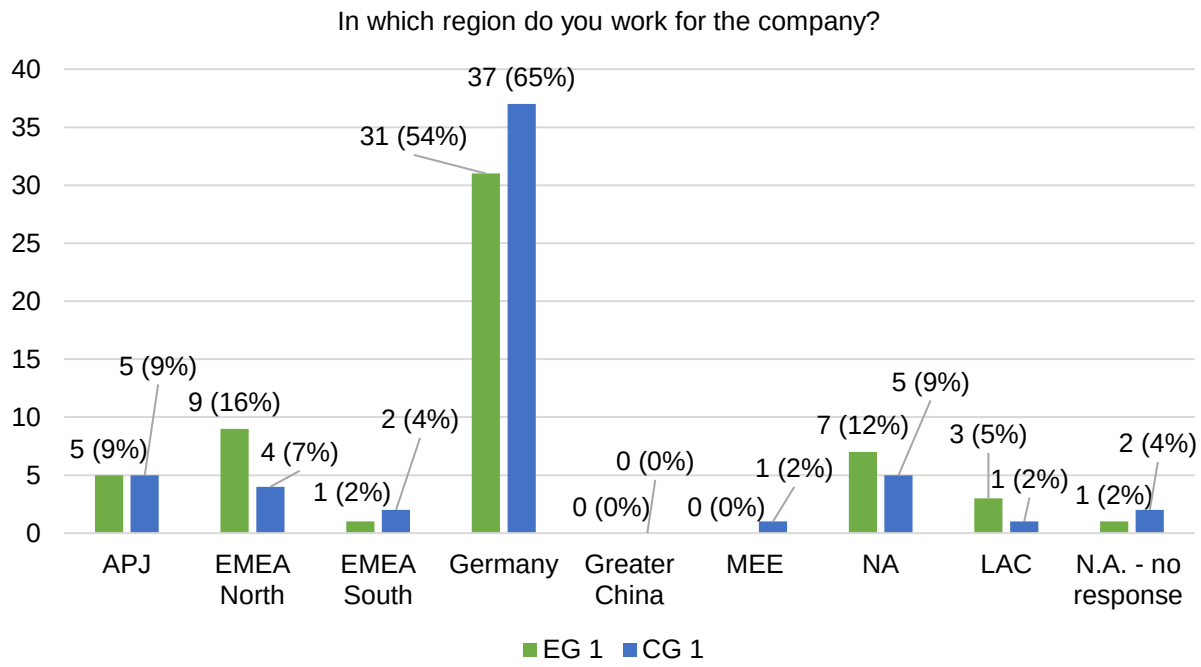


Figure 3-5. Socio-demographic Information EG 1 and CG 1: Region of Work.

The second demographic question contains the gender of the users (see Figure 3-6). Gender is almost balanced with 49% of EG 1 being female and 46% being male. Solely 5% of the colleagues did not indicate their gender. Regarding CG 1, 63% of the individuals are female and the rest are male.

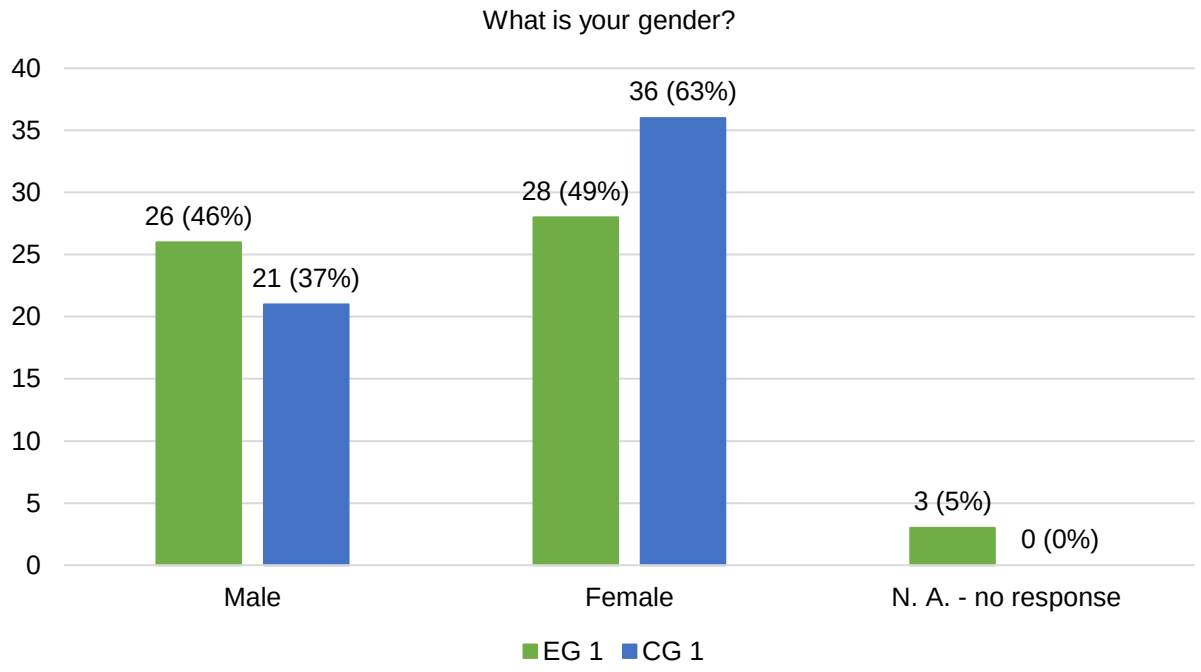


Figure 3-6. Socio-demographic information EG 1 and CG 1: Gender.

Concerning the age, which is illustrated in Figure 3-7, most of the employees of the first experimental group (37%) are between 30 and 39 years old. Furthermore, 23% of the participants in EG 1 and 21% of the participants in CG 1 are between 18 and 29 years old. A little bit more than one fourth of EG 1 and 28% from CG 1 are middle-aged (40 – 49 years). The largest proportion of the participants in CG 1 is in the age range 50 to 59 years (35%). Neither participants from EG 1 nor participants from CG 1 are older than 60 years, and 5% of EG 1 did not indicate their age.

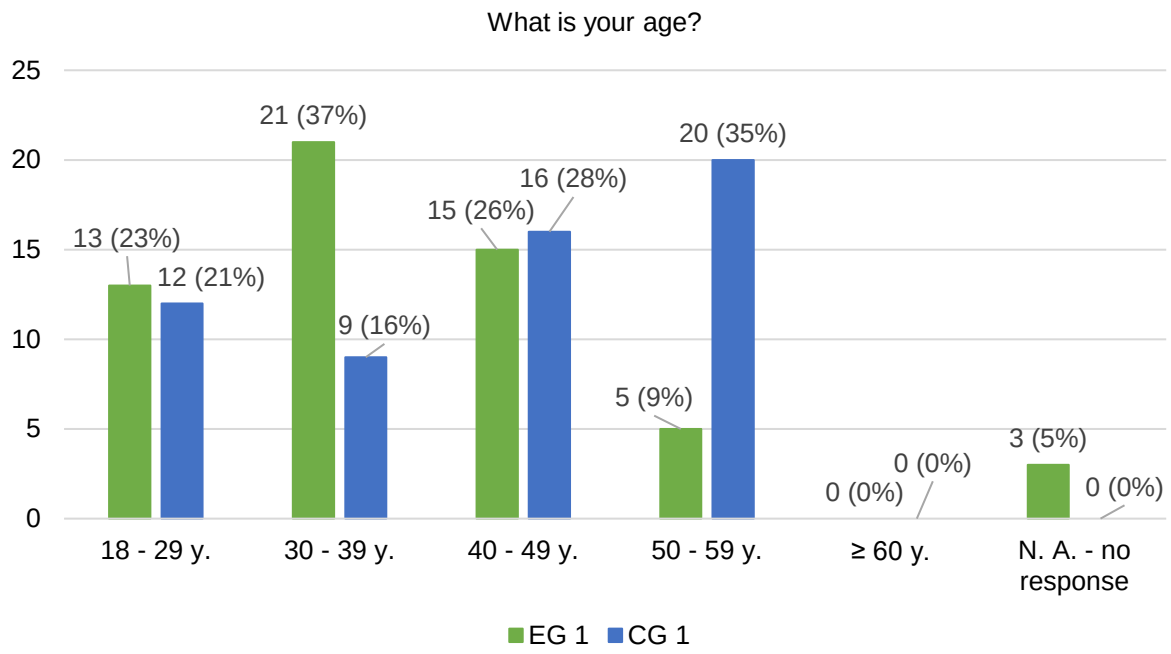


Figure 3-7. Socio-demographic Information EG 1 and CG 1: Age.

The following focuses on the educational background of the gamified learning players (EG 1) and CG 1 (see Figure 3-8). More than half of the participants in EG1 (56%) and CG 1 (53%) hold a master's degree. Furthermore, more than one fourth of EG 1 (28%) and one fourth of CG 1 (25%) have a bachelor's degree. Besides, almost one tenth of EG 1 and 14% of CG 1 hold a doctorate degree. Few participants in EG 1 and CG 1 indicated high school graduate and secondary school. Finally, 4% of the participants in CG 1 indicate 'Other' as their education which means that according to the free text comments in the survey, they did an apprenticeship. For the statistical analysis, education was divided into two groups, high education (master's and doctorate degree) and medium education (secondary school, high school, bachelor, and other (i.e., apprenticeship) to better represent it.

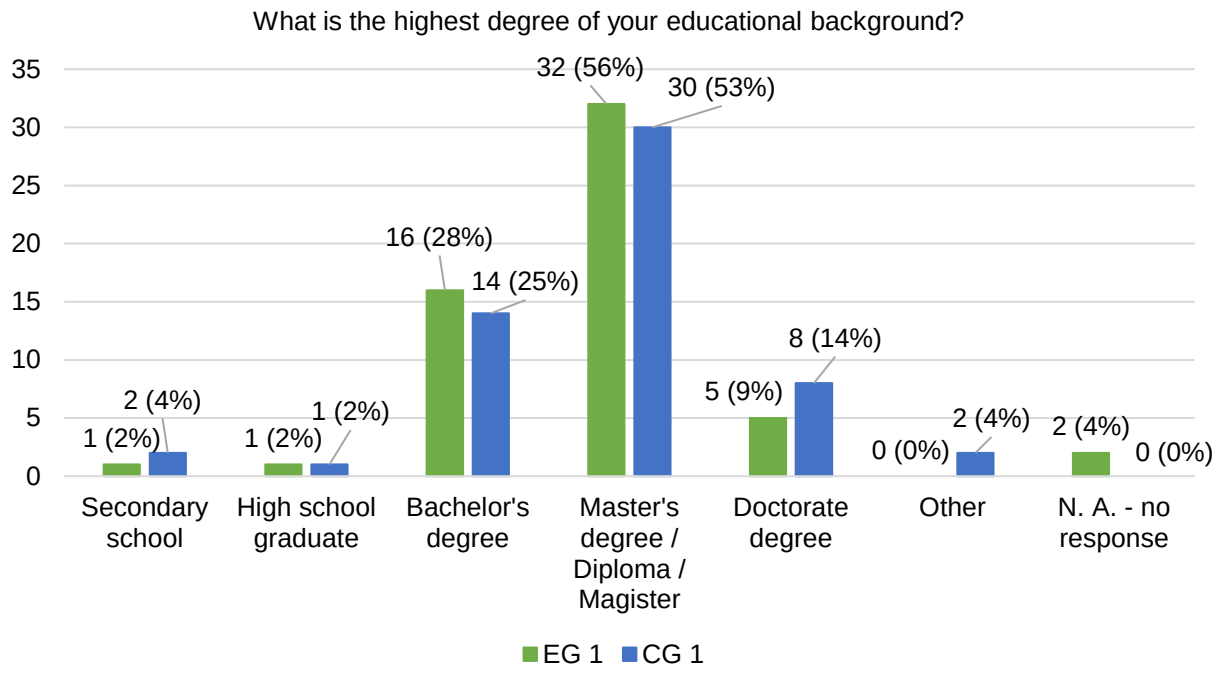


Figure 3-8. Socio-demographic Information EG 1 and CG 1: Education.

Regarding the current employment status (see Figure 3-9), 68% of the respondents from EG 1 and 84% from CG 1 are working full-time at the company whereas one fourth of the participants in EG 1 and 7% from CG 1 report that they work part-time. Additionally, 5% of the participants in EG 1 and 9% of CG 1 indicated 'Other'. This indicates that as stated by the free text comments in the survey, they are employed as working students a couple of times per week at the corporation.

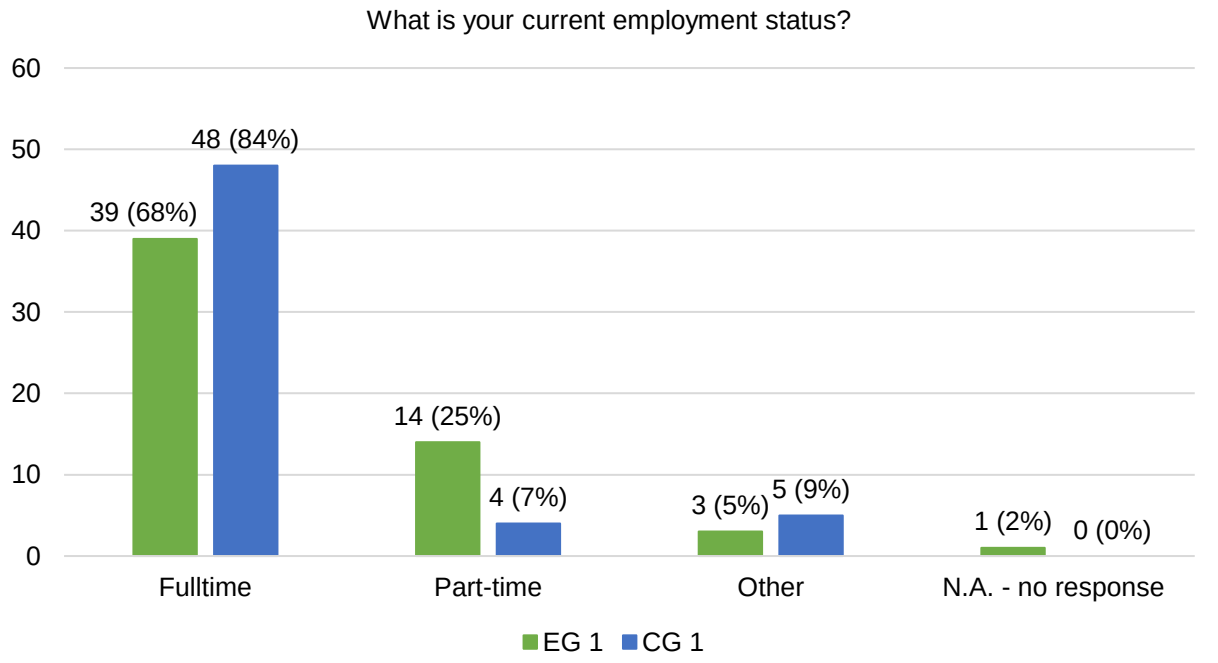


Figure 3-9. Socio-demographic Information EG 1 and CG 1: Employment status.

Considering the last question of the socio-demographic information (see Figure 3-10), 21% of EG 1 and 23% of CG 1 have been working up to 2 years in the company. The same amount of participants in EG 1 and 9% of CG 1 have been working between 3 and 5 years in the company. Moreover, 9% of EG 1 and 14% of CG 1 have been working between 6 and 10 years in the corporation. More than one fourth of the employees from EG 1 and 14% in CG 1 have been working between 11 and 15 years at the software corporation. Besides that, 16% of the participants in EG 1 and 18% from the members of CG 1 have been working in the corporation between 16 and 20 years. Furthermore, 5% of the participants from EG 1 and 23% from the members in CG 1 have been working at the software corporation for more than 21 years. In sum, the samples reflect a very heterogeneous picture in terms of company affiliation.

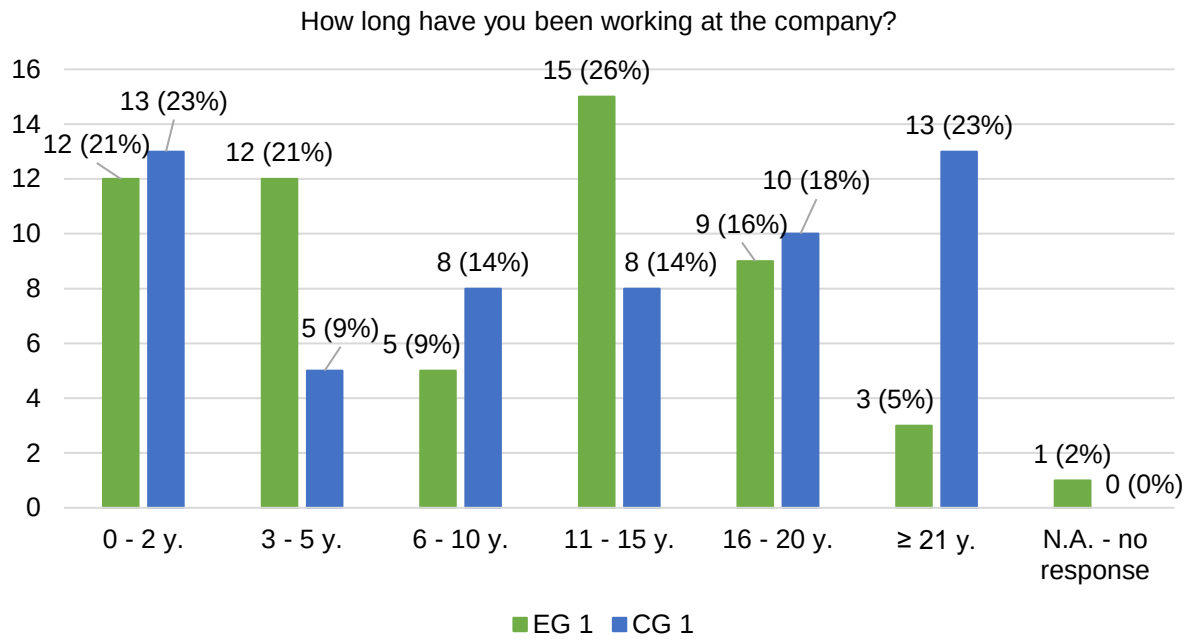


Figure 3-10. Socio-demographic Information EG 1 and CG 1: Company Affiliation.

Overall, Chi-square test revealed that there are no statistical differences between the two groups (EG 1 and CG 1) in terms of the socio-demographic data. In sum, the collected socio-demographic data (i.e., region of work, age, education, employment status, and company affiliation in years) match the image of the workforce. Especially in Germany, the majority of the workforce is working full-time and the length of service for the company is heterogeneous. Nevertheless, when it comes to gender, the numbers differ. In the study, the distribution of women (56%) is slightly higher than the distribution of men (42%). In the entire development organization, however, the male to female ratio is rather 70% to 30%. The next chapter describes the results of the gamification elements in the HERO training.

3.3.2 Gamification Elements

The results of the gamification elements in the gamified online training are explained in more detail below. The levels, badges, and team function are mentioned. There are five different levels within the gamified online training: seeker, discoverer, adventurer, conqueror, and finally, *HERO of the Jungle*. Table 3-5 shows the number of participants who reached the respective levels in the gamified online training.

Table 3-5

Levels achieved in Gamified Online Training

Level	1: Seeker (0 – 49 XP)	2: Discoverer (50 – 99 XP)	3: Adventurer (100 – 149 XP)	4: Conqueror (150 – 249 XP)	5: HERO of the Jungle (≥ 250 XP)
N	36 (63%)	8 (14%)	2 (4%)	3 (5%)	8 (14%)

Note. N = Number of participants

Most of the participants (63%) earned the lowest number of experience points (0 – 49 XP), representing the first level. It was ensured in advance that all participants had done at least one exercise or quiz in the gamified online training and that no one had 0 points. The second level (50 – 99 XP) was reached by 14% of the users from the experimental group 1. Furthermore, 4% of the players belong to the third level and 5% of the participants reached level four. Finally, 14% of the gamified learners reached the fifth and last level by gaining at least 250 XP. They can be called ‘HERO’ of the jungle because they finished all chapters and made it through the entire gamified online training. Next, Table 3-6 illustrates the number of participants who earned the different badges.

Table 3-6

Badges achieved in Gamified Online Training

Badges	Animal Selfie	Animal traveler	Explo-rer	Women Power	Innova-tion badge	My first animal experience	Welcome Team	Hall of fame
N	2 (4%)	2 (4%)	2 (4%)	2 (4%)	0 (0%)	20 (35%)	2 (4%)	8 (15%)

Note. N = Number of participants

As can be seen in Table 3-6, 35% of the participants earned the My first animal experience badge. Moreover, 14% of the participants entered the Hall of Fame meaning that they completed the gamified online training. Nobody received the innovation badge and 4% of the players received all other badges.

Lastly, the team function in the gamified online training is mentioned. This element addresses the teamwork component in HERO training (see Table 3-7). A team consists of three to five participants in the gamified online training. There was a full team of three team members who benefited from the team

building. In addition, there were seven incomplete teams with two team members which were looking for one additional team member each. Five participants were searching for two additional team members to form a team. Lastly, there were no teams of four or five participants. When participants are playing in a team, they receive more experience points (XP) and progress faster in the PsyCap training. As mentioned earlier, the element of team building is intended to create a social component in the gamified online training. Hence, team-oriented learning is emphasized in the gamified online training.

Table 3-7
Number of Teams in Gamified Online Training

Teams with 1 member	5
Teams with 2 members	7
Teams with 3 members	1
Teams with 4 members	0
Teams with 5 members	0

In sum, the gamification elements such as the badges and team function were rarely used in the gamified online training and only a few participants reached the highest training level. The next chapter provides information on the descriptive statistics of study 1.

3.3.3 Descriptive Statistics

As described in chapter 2.1 (Study Samples and Research Design), 261 participants from EG 1 completed the online survey at the first measurement point (T1), and 57 individuals participated in the gamified online training as well as in the online survey at T2. On average, the participants achieved 59 experience points in the HERO training which can be equated with having reached the second level. The control group consisted of participants from a different organization within the company that had the most overlap with the development organization for job roles. At the beginning, 219 participants from the CG completed the online survey at T1, and 57 participants answered the online survey at T2. For the comparison to EG 1, the number of participants from the control group who completed 2 measurement points is used (i.e., CG 1). Hence, the two groups in study 1 were equally distributed. Due to technical difficulties in the gamified online training, no data was available at the third measurement point.

Table 3-8 shows the mean values (*M*), standard deviations (*SD*), and internal consistencies (Cronbach's alpha) of the individual scales of the PCQ including the values for the overall PsyCap, work engagement (WE), job satisfaction (JS), and organizational commitment (OC). It needs to be taken into account that the scales are scaled differently (PsyCap 1-6, WE 0-6, JS 1-5, OC 1-7). This means that on some scales it is easier to get higher mean values. The comparability of the mean values is therefore limited.
Regarding the first measurement point, EG 1 shows the highest mean value and at the same time the lowest standard deviation in resilience (M = 4.55; SD = .56) for the individual PsyCap elements. The

lowest mean value for the PsyCap components can be observed in optimism (*M* = 4.16; *SD*=.67). According to T2, EG 1 displays the highest mean value again in resilience (*M* = 4.80; *SD* = .57) and the lowest mean values in optimism (*M* = 4.41; *SD* = .73). Overall, the mean values for EG 1 for the PsyCap resources at T1 vary between *M* = 4.16 and *M* = 4.55, which indicates a right-hand distribution, and between *M* = 4.41 and *M* = 4.80 at T2 indicating a right-hand distribution as well. The standard deviations of the individual scales take on values between .53 and .84 for T_1 and T_2. Lastly, there were similar high mean values in WE, JS, and OC as in PsyCap for EG 1. All scales in EG 1 indicate a positive trend in their mean values between T1 and T2 as well as a right-hand distribution except for organizational commitment (M_{T1} = 3.85; SD_{T1} =.70; M_{T2} =3.77; SD_{T2} =.65).

Table 3-8

Descriptive Statistics of all Variables from EG 1 and CG 1 for all Measurement Points

	EG 1			CG 1		
	M	SD	α	M	SD	α
Self-efficacy_T_1	4.38	.84	.82	4.81	.78	.83
Self-efficacy_T_2	4.61	.81	.78	4.81	.77	.84
Hope_T_1	4.41	.63	.76	4.63	.80	.87
Hope_T_2	4.68	.80	.86	4.57	.85	.88
Resilience_T_1	4.55	.56	.65	4.60	.65	.74
Resilience_T_2	4.80	.57	.65	4.55	.73	.82
Optimism_T_1	4.16	.67	.64	4.41	.76	.82
Optimism_T_2	4.41	.73	.71	4.32	.88	.80
PsyCap_T_1	4.37	.53	.87	4.61	.63	.93
PsyCap_T_2	4.65	.54	.89	4.56	.70	.93
WE_T_1	3.84	.90	.93	4.00	.78	.88
WE_T_2	4.12	.89	.93	4.00	.82	.92
JS_T_1	3.82	.63	.68	3.84	1.00	.87
JS_T_2	4.00	.77	.78	4.00	.88	.88
OC_T_1	3.85	.70	.74	4.24	.81	.78
OC_T_2	3.77	.65	.67	4.20	.90	.83

Note. WE = Work engagement; JS = Job satisfaction; OC = Organizational commitment; EG 1:$_{T1\text{-}2:}$ *N* = 57; CG 1:$_{T1\text{-}2:}$ *N* = 57;

Regarding CG 1, the highest mean value of the PsyCap elements can be observed in efficacy at T1 and T2 (M_{T1} = 4.81; M_{T2} = 4.81). Besides that, the lowest mean value of the PsyCap elements in CG 1 can be detected in optimism at T1 (*M* = 4.41; *SD* = .76) and T2 (*M* = 4.32; *SD* = .88). Like in EG 1, PsyCap itself in CG 1 has the lowest standard deviations for all scales at both measurement points (SD_{T1} = .63;

SD_{T2} = .70). Overall, the mean values for the PsyCap resources in CG 1 at T1 vary between *M* = 4.41 and *M* = 4.81, which indicates a right-hand distribution and differ between *M* = 4.32 and *M* = 4.81 at T2 also indicating a right-hand distribution. The standard deviations of the individual PsyCap scales take on values between .56 and .84 for T_1 and between .57 and .81 for T_2. Finally, there were similar high mean values in WE, JS, and OC as in PsyCap for CG 1. All scales in CG 1 indicate a negative trend in their mean values between T1 and T2 except for job satisfaction (M_{T1} = 3.84; SD_{T1} = 1.00; M_{T2} = 4.00; SD_{T2} = .88). The mean values for self-efficacy (M_{T1} = 4.81; SD_{T1} = .78; M_{T2} = 4.81; SD_{T2} = .77) and work engagement (M_{T1} = 4.00; SD_{T1} = .78; M_{T2} = 4.00; SD_{T2} = .82) stay the same over time.

The quality of the scales was analyzed by reliability analyzes. This is often recommended in the literature on questionnaire design (Bühner, 2011; Kallus, 2016). Each dimension of the PsyCap scale (namely self-efficacy, hope, resilience, and optimism) consists of six items. The overall PsyCap scale shows a Cronbach's alpha of .87 for EG 1 (.93 for CG 1) at T1 and .89 for EG 1 (.93 for CG 1) at T2 indicating a moderate to high reliability (Bortz & Döring, 2016). The results also apply to the subscales of PsyCap indicating reliability alphas above the minimal acceptable level of .70 (Bortz & Döring, 2016) except for resilience at T1 and T2 in EG 1 (α = .65) and optimism at T2 in EG 1 (α = .65).
The dimensions vigor and absorption in the Utrecht Work Engagement Scale (UWES) consist of six items and the dimension dedication consists of five items. The overall UWES scale (17 items) shows a Cronbach's alpha of .93 (.88 for CG 1) and a Cronbach's alpha of .93 (.92 for CG 1) at T2. The reliability of this scale can therefore be considered as highly satisfactory (Bortz & Döring, 2016).
On the overall satisfaction scale (3 items), a Cronbach's alpha of .68 (and .87 for CG 1) was calculated for T1 and a Cronbach's alpha of .78 for T2 (.88 for CG 1) which can be considered as sufficient (Bortz & Döring, 2016).
Each dimension of the Three-Component Model (TCM) for commitment (namely affective, continuance, and normative commitment) consists of six items. For the organizational commitment scale, a Cronbach's alpha of .74 can be calculated for T1 (.78 for CG 1) and a Cronbach's alpha of .67 for T2 (.83 for CG 1). The overall reliability commitment scale can be considered sufficient (Bortz & Döring, 2016).

Overall, work engagement (WE) shows the highest values in the reliability analysis in EG 1 at T1 and T2 compared to all other measured scales. In addition, PsyCap shows the highest values in CG 1 at both measurement points in comparison to the other scales. Job satisfaction (JS) shows the lowest values in the reliability analysis in EG 1 at T1 and organizational commitment (OC) shows the lowest values in the reliability analysis T2 compared to all other measured scales. OC shows the lowest values in CG 1 at both measurement points in comparison to the other scales. In sum, the reliability of all scales (i.e., PsyCap, WE, JS, and OC) in the online survey can be considered sufficient (Bortz & Döring, 2016) except for the resilience scale in EG 1 (α = .65) and the optimism scale at T2 in EG 1 (α = .65). The next chapter presents the results of the inferential statistics to answer the hypotheses of the first study.

3.3.4 Inferential Statistics

In this chapter the results of the inferential statistical analyzes from the gamified online training (study 1) are reported and graphically presented. As described in chapter 3.3.1, EG 1 and CG 1 both consist of 57 participants. T-test analyzes for independent samples revealed that the mean values between EG 1 and CG 1 at T1 were significantly different for PsyCap ($t(112) = 2.19$; $p = .03$) and self-efficacy ($t(112) = 2.84$; $p = .01$). This means that the two groups already differed significantly in their mean values for PsyCap and self-efficacy before the intervention. CG 1 showed higher mean values. Besides that, t-test analyzes for independent samples revealed that the mean values between EG 1 and CG 1 at T1 were not statistically significant different for hope ($t(112) = 1.65$; $p = .10$), resilience ($t(112) = .40$; $p = .70$), and optimism ($t(112) = 1.90$, $p = .06$). The next section presents the results of the inferential statistical analyzes to answer the hypotheses.

Hypothesis 1:
EG 1 will show a significant increase in their PsyCap at T2 compared to CG 1.

The ANCOVA with repeated measures to test hypothesis 1 showed a significant main effect for PsyCap ($F(1,112) = 4.54$; $p = .036$; $\eta^2 = .041$) which can be seen in Table 3-9.

Table 3-9
Statistical Analysis of PsyCap in EG 1 and CG 1

Source	F-value	df1	df2	Sig.	Partial Eta squared
PsyCap	4.536	1	112	**.036**	.041
Group	1.387	1	112	.241	.013
PsyCap * Group	1.164	1	112	.283	.011
PsyCap * Age	.533	1	112	.467	.005
PsyCap * Group * Age	.871	1	112	.353	.008
PsyCap * Gender	.383	1	112	.537	.004
PsyCap * Group * Gender	.646	1	112	.423	.006
PsyCap * Education	.144	1	112	.705	.001
PsyCap * Group * Education	.489	1	112	.486	.004

Figure 3-11 shows the course for EG 1 and CG 1 in PsyCap graphically. It is noticeable that the PsyCap values in CG 1 slightly decrease over time ($M_{T1} = 4.61$; $SD_{T1} = .63$; $M_{T2} = 4.56$; $SD_{T2} = .70$). In contrast, the PsyCap values in EG 1 slightly increase over time ($M_{T1} = 4.37$; $SD_{T1} = .53$; $M_{T2} = 4.65$, $SD_{T2} = .54$). However, there are no significant interaction effects with the group (or other potentially confounding variables). Thus, hypothesis 1 must be rejected.

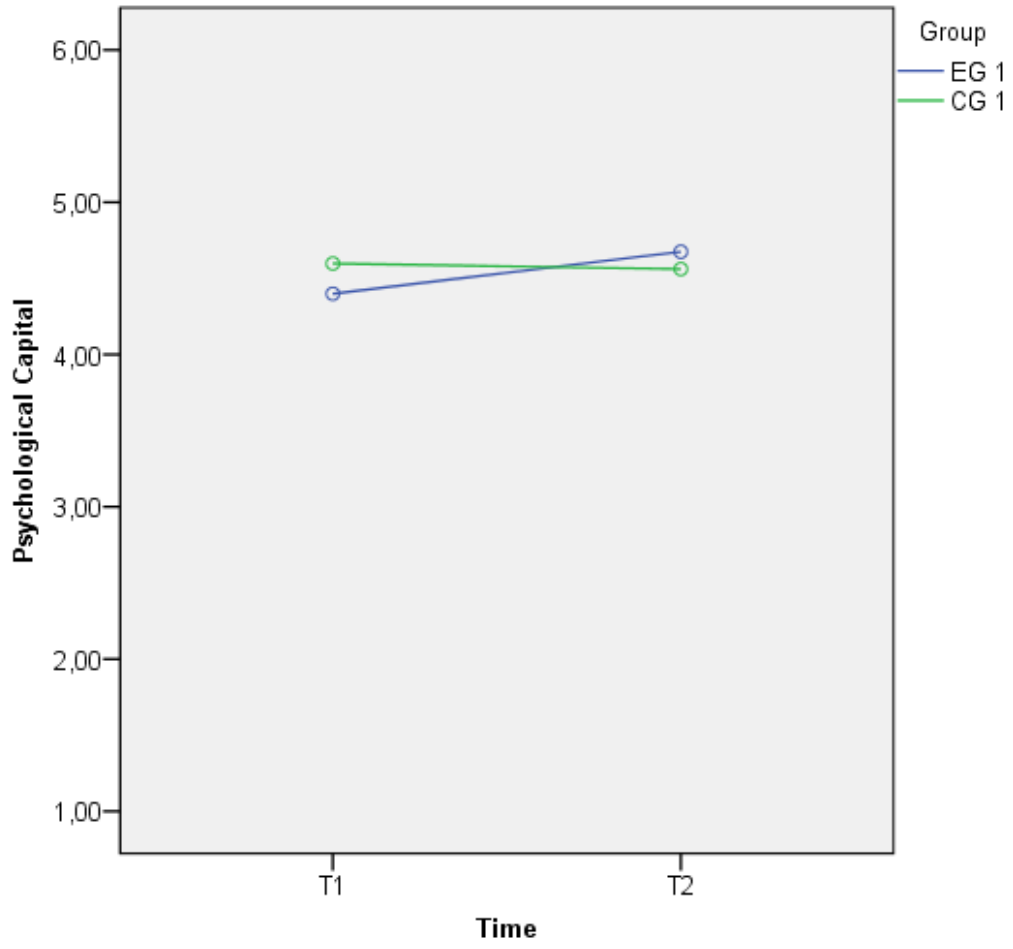


Figure 3-11. Course in PsyCap for EG 1 and CG 1.

Hypothesis 1a:
EG 1 will show a significant increase in their hope at T2 compared to CG 1.

The ANCOVA with repeated measures to test hypothesis 1a revealed neither significant main effects nor any interaction effects (see Table 3-10). Hypothesis 1a must therefore be rejected.

Table 3-10

Statistical Analysis of Hope in EG 1 and CG 1

Source	F-value	df1	df2	Sig.	Partial Eta squared
Hope	3.419	1	112	.067	.031
Group	.007	1	112	.933	.000
Hope * Group	.187	1	112	.666	.002
Hope * Age	.180	1	112	.672	.002
Hope * Group * Age	.564	1	112	.454	.005
Hope * Gender	.738	1	112	.392	.007
Hope * Group * Gender	.012	1	112	.914	.000
Hope * Education	2.406	1	112	.124	.022
Hope * Group * Education	1.181	1	112	.280	.011

Figure 3-12 illustrates the course of hope for EG 1 and CG 1 at T1 and T2. It can be observed that the values in CG 1 tend to decrease slightly over time (M_{T1} = 4.63; SD_{T1} = .80; M_{T2} = 4.57; SD_{T2} = .85). EG 1 shows a slight increase in hope (M_{T1} = 4.41; SD_{T2} = .63; M_{T2} = 4.68; SD_{T2} = .80).

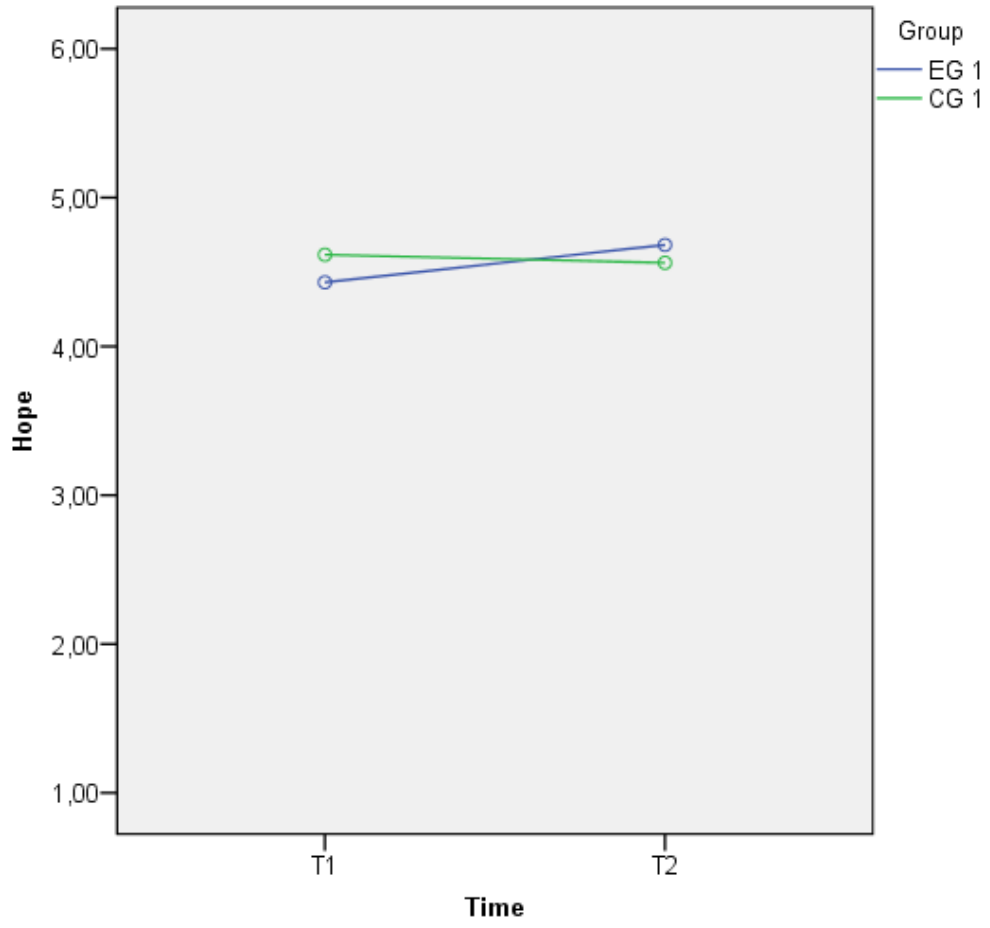


Figure 3-12. Course in Hope for EG 1 and CG 1.

Hypothesis 1b:
EG 1 will show a significant increase in their self-efficacy at T2 compared to CG 1.

The ANCOVA with repeated measures to test hypothesis 1b showed a significant main effect for self-efficacy ($F(1,112) = 7.51$; $p = .007$; $\eta^2 = .066$) which is illustrated in Table 3-11. Besides that, there were no significant differences in the main effects or in the interaction effects. Hypothesis 1b needs to be rejected.

Table 3-11

Statistical Analysis of Self-efficacy in EG 1 and CG 1

Source	F-value	df1	df2	Sig.	Partial Eta squared
Self-efficacy	7.507	1	112	**.007**	.066
Group	.074	1	112	.786	.001
Self-efficacy * Group	.262	1	112	.610	.002
Self-efficacy * Age	1.158	1	112	.284	.011
Self-efficacy * Group * Age	.095	1	112	.758	.001
Self-efficacy * Gender	2.179	1	112	.143	.020
Self-efficacy * Group * Gender	.458	1	112	.500	.004
Self-efficacy * Education	2.633	1	112	.108	.024
Self-efficacy * Group * Education	.004	1	112	.951	.000

The course of self-efficacy of EG 1 and CG 1 at T1 and T2 is shown in Figure 3-13. It can be seen that the values in CG 1 tend to stay the same over time ($M_{T1} = 4.81$; $SD_{T1} = .78$; $M_{T2} = 4.81$; $SD_{T2} = .77$) whereas EG 1 shows a slight increase in self-efficacy ($M_{T1} = 4.38$; $SD_{T1} = .84$; $M_{T2} = 4.61$; $SD_{T2} = .81$).

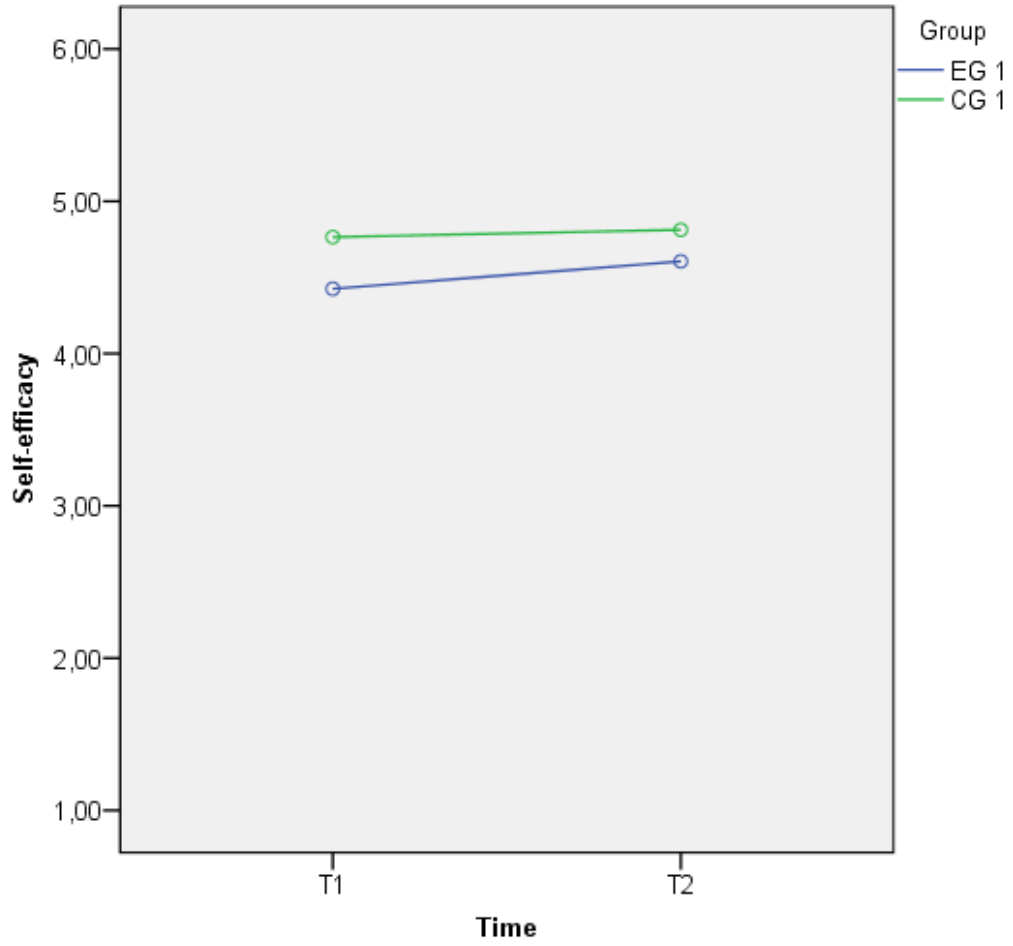


Figure 3-13. Course in Self-efficacy for EG 1 and CG.

Hypothesis 1c:
EG 1 will show a significant increase in their resilience at T2 compared to CG 1.

The ANCOVA with repeated measures to test hypothesis 1c showed a significant main effect for resilience ($F(1,112) = 7.20$; $p = .008$; $\eta^2 = .064$) which is illustrated in Table 3-12).

.

Table 3-12

Statistical Analysis of Resilience in EG 1 and CG 1

Source	F-value	df1	df2	Sig.	Partial Eta squared
Resilience	7.202	1	112	**.008**	.064
Group	.070	1	112	.792	.001
Resilience * Group	1.394	1	112	.240	.013
Resilience * Age	1.759	1	112	.188	.016
Resilience * Group * Age	2.562	1	112	.112	.024
Resilience * Gender	1.204	1	112	.275	.011
Resilience * Group * Gender	1.589	1	112	.210	.015
Resilience * Education	.603	1	112	.439	.005
Resilience * Group * Education	.002	1	112	.968	.000

The following graph (see Figure 3-14) illustrates the course of resilience for EG 1 and CG 1 at the two measurement points. The values in resilience from CG 1 slightly decrease over time (M_{T1} = 4.60; SD_{T1} = .65; M_{T2} = 4.55; SD_{T2} = .73). On the other hand, the values in EG 1 show a slight increase from T1 to T2 (M_{T1} = 4.55; SD_{T1} = .56; M_{T2} = 4.80; SD_{T2} = .57). However, there were no significant interaction effects. Hypothesis 1c must therefore be rejected.

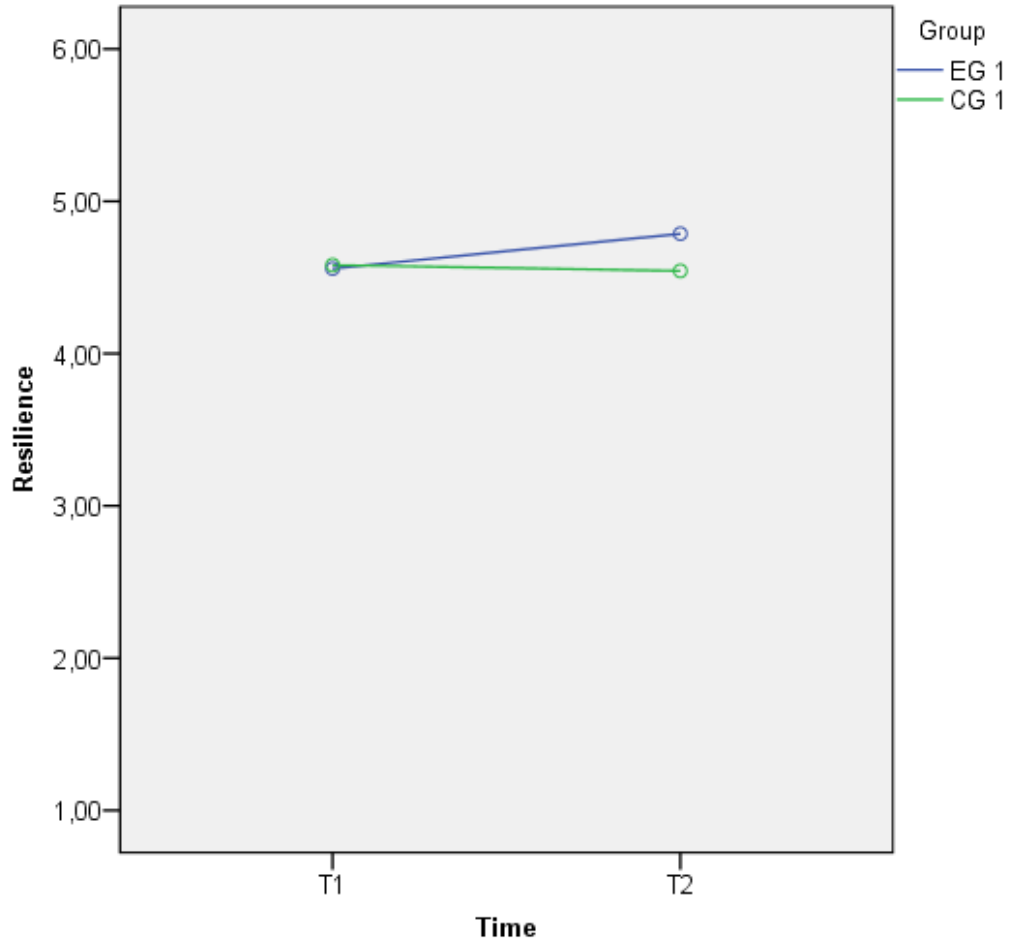


Figure 3-14. Course in Resilience for EG 1 and CG 1.

Hypothesis 1d:
EG 1 will show a significant increase in their optimism at T2 compared to CG 1.

The ANCOVA with repeated measures to test hypothesis 1d showed no significant main or interaction effects (see Table 3-13). Hence, hypothesis 1d must be rejected.

Table 3-13

Statistical Analysis of Optimism EG 1 and CG 1

Source	F-value	df1	df2	Sig.	Partial Eta squared
Optimism	2.926	1	112	.090	.027
Group	3.667	1	112	.058	.033
Optimism * Group	.022	1	112	.882	.000
Optimism * Age	2.504	1	112	.117	.023
Optimism * Group * Age	.954	1	112	.331	.009
Optimism * Gender	.145	1	112	.704	.001
Optimism * Group * Gender	.002	1	112	.965	.000
Optimism * Education	1.571	1	112	.213	.014
Optimism * Group * Education	.510	1	112	.477	.005

The course in optimism from EG 1 and CG 1 at T1 and T2 is shown in Figure 3-15. It is noteworthy that the values in CG 1 slightly decrease over time (M_{T1} = 4.41; SD_{T1} = .76; M_{T2} = 4.32; SD_{T2} = .88), while the values in EG 1 slightly increase over time (M_{T1} = 4.16; SD_{T1} = .67; M_{T2} = 4.41; SD_{T2} = .73).

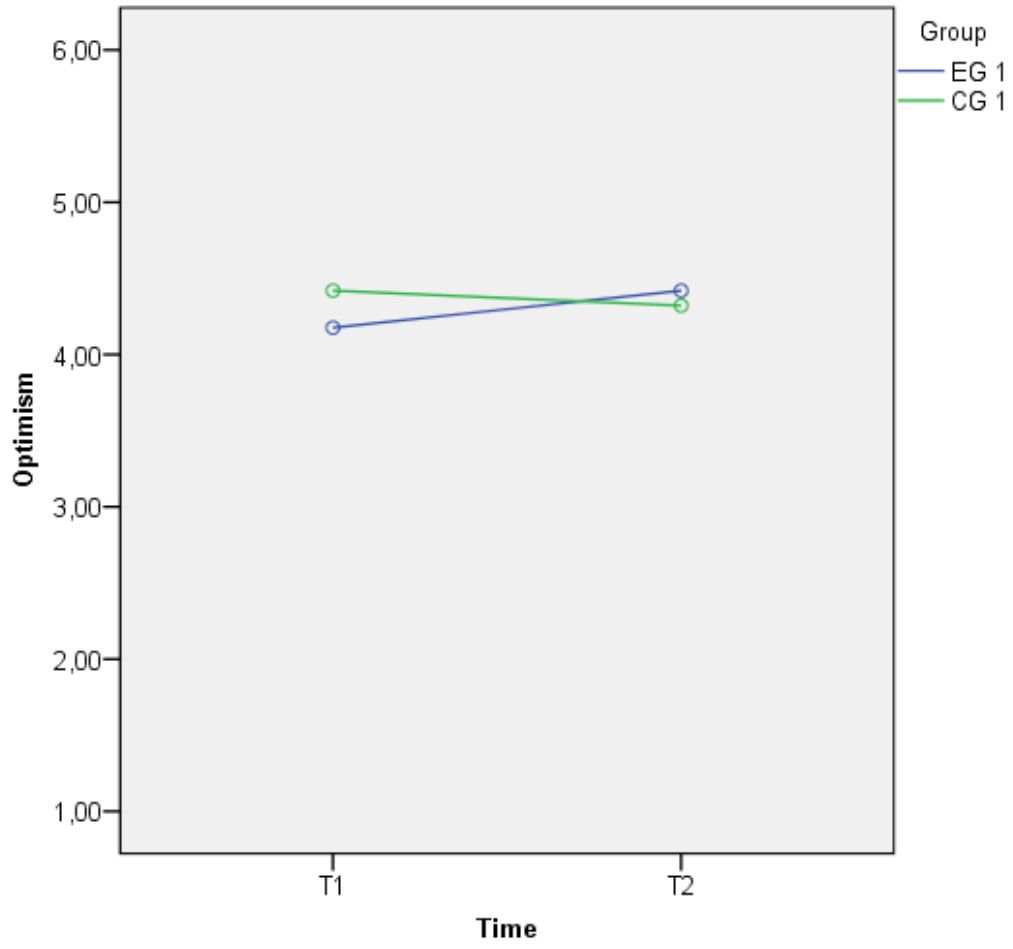


Figure 3-15. Course in Optimism for EG 1 and CG 1.

Further Analyzes: High vs. low Engagement in the Gamified Online Training

This section describes additional results when dividing the participants of the gamified online training into high and low engaged users. Highly engaged participants include those who belong to levels 2-5 (50 – ≥250 XP; *N* = 21), while those who are less engaged belong to level 1 (0 – 49 XP; *N* = 36) (see chapter 3.3.2, Table 3-5 for further details). The descriptive statistics of EG 1 with high and low engagement can be found in Appendix F. To test whether the highly engaged participants differ statistically from the less engaged participants in their PsyCap and its elements at T2, the same analyzes, analysis of covariance (ANCOVA) with repeated measures were conducted (see Appendix G). In addition, age, gender, and education were included as covariates. On the overall PsyCap scale there was a significant interaction effect when controlled for gender ($F(1,55) = 4.30$; $p = .044$; $\eta^2 = .080$), according to which men had a higher increase in PsyCap in the low-engaged group after the gamified online training compared to women, while women had a higher increase in PsyCap in the high-engaged group compared to men. The effect can be considered a weak effect (Pospeschill, 2006). Besides that, there were neither significant main effects nor interaction effects for the overall PsyCap scale or the four PsyCap elements.

In sum, the statistical analysis of hypothesis 1 showed a significant main effect for PsyCap. However, there was no significant interaction effect with the group and therefore hypothesis 1 must be rejected. Regarding the PsyCap elements (hypotheses 1a-1d), there was a significant main effect for self-efficacy and resilience. Nevertheless, there were no significant interaction effects with the group for the PsyCap elements. Consequently, hypotheses 1a – 1d need to be rejected. In addition, when the participants were split into high and low engaged, there was a significant interaction effect with the group for PsyCap when controlled for gender. The effect can be considered a weak effect. Since PsyCap has been strongly linked in previous research to desired employee attitudes, behaviors, and performance such as job satisfaction, work engagement, and organizational commitment (Avey et al., 2011), these hypotheses are presented next.

Hypothesis 2:
The employees' level of PsyCap from EG 1 and CG 1 will be positively related to their job satisfaction at T1 and T2.

As can be seen in Table 3-14, there is a statistically significant positive correlation between PsyCap and job satisfaction at the first time of measurement ($r = .45$; $p < .01$). According to Zöfel (2003) this can be seen as a weak correlation. A statistically significant positive correlation between PsyCap and job satisfaction can also be reported at the second measurement point ($r = .62$; $p < .01$). This can be regarded as a medium correlation (Zöfel, 2003). Hypothesis 2 can therefore be accepted. In addition, there is also a significant positive correlation between PsyCap at T1 and job satisfaction at T2 ($r = .18$; $p < .05$) which can be interpreted as a very low correlation (Zöfel, 2003). It should be mentioned that the

correlations remain more or less the same when the groups (EG 1 and CG 1) are separated. This accordingly applies to hypotheses 3 and 4.

Hypothesis 3:
The employees' level of PsyCap from EG 1 and CG 1 will be positively related to their engagement at work at T1 and T2.

At the first time of measurement, Table 3-14 shows a statistically significant positive correlation between PsyCap and work engagement (r = .66; p <.01) which can be regarded as a medium correlation (Zöfel, 2003). A statistically significant positive correlation between PsyCap and work engagement can also be reported at the second time of testing (r = .75; p < .01). This can be considered a high correlation (Zöfel, 2003). Hypothesis 3 can therefore be accepted. Furthermore, there is also a significant positive correlation between PsyCap at T1 and work engagement at T2 (r = .22; p < .01) which can be regarded as low correlation (Zöfel, 2003).

Hypothesis 4:
The employees' level of PsyCap from EG 1 and CG 1 will be positively related to their organizational commitment at T1 and T2.

As can be seen in Table 3-14, there is no statistically significant correlation between PsyCap and organizational commitment at the first measurement point. This is also true for the correlation of PsyCap and organizational commitment at the second measurement point. Overall, hypothesis 4 must be rejected. Nevertheless, there is a significant positive correlation between PsyCap at T1 and organizational commitment at T2 (r = .18; p < .01). According to Zöfel (2003) this can be considered a very low correlation. If, however, the organizational commitment scale is broken down into the three subscales (affective, continuance, and normative commitment scale), there is a significant positive correlation between PsyCap and the affective commitment scale (ACS) at T1 (r = .30; p < .01) as well as between PsyCap and the ACS at T2 (r = .37; p < .01) (see Appendix M.1 for further details). This can be regarded as a low correlation (Zöfel, 2003). Furthermore, a significant negative correlation can be found between PsyCap and the continuance commitment scale (CCS) at T1 (r = -.30; p < .05) as well as between PsyCap and the CCS at T2 (r = -.22; p < .01). According to Zöfel (2003) this can be interpreted as a low correlation. Lastly, there is a significant positive correlation between PsyCap and the normative commitment scale (NCS) at T1 (r = .16; p < .05) which can be seen as a very low correlation (Zöfel, 2003).

Table 3-14

Correlation of Dependent and Independent Variables from Study 1 at T1 and T2

	1	2	3	4	5	6	7	8
1. PsyCap_T1	—							
2. JS_T1	.453**	—						
3. WE_T1	.663**	.604**	—					
4. OC_T1	.075	.229**	.210*	—				
5. PsyCap_T2	.201*	.126	.283**	-.146	—			
6. JS_T2	.176*	.332**	.307**	-.047	.619**	—		
7. WE_T2	.222**	.244*	.482**	-.024	.748**	.717**	—	
8. OC_T2	.176*	.213*	.232**	.520**	.081	.327**	.224**	—

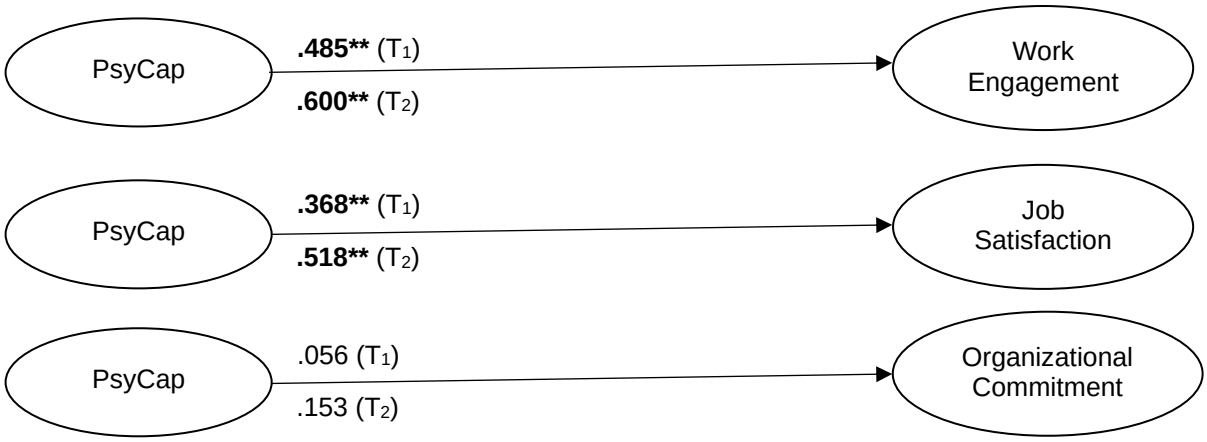
Note. ** = p < .01; * = p < .05; *N* = 114

Further Analyzes: Influence of PsyCap on work-related Variables in the Gamified Online Training

To determine whether PsyCap and its dimensions explain variance in important work-related variables (i.e., work engagement, job satisfaction, and organizational commitment) in the gamified online training, a multiple regression analysis was conducted (see Appendix N.1 for detailed information). For this analysis, the four PsyCap dimensions (independent variables; measured as total score) as well as the respective workplace components (dependent variables) were included in the model (see Figure 3-16). In a further step, the PsyCap dimensions were looked at more closely to find out what influence they have on the work-related variables.

As a result, 48.5% (R^2 = .485) of the variance in work engagement is explained by PsyCap at T1 with hope as a significant predictor of work engagement (β =.502; p < .05). At T2, 60% (R^2 = .600) of the variance in work engagement is explained by PsyCap including self-efficacy (β =.407; p < .05), hope (β = .273; p < .05), and optimism (β = .266; p < .05) as significant predictors for work engagement.

Based on the findings, 36.8% (R^2 = .368) of the variance in job satisfaction is explained by PsyCap at the first measurement point. In this context, optimism is a significant predictor for job satisfaction (β = .492; p = .05). At the second time of measurement, 51.8% (R^2 = .518) of the variance in job satisfaction is explained by PsyCap. This time, hope (β = .603; p = .05) and optimism (β = .239; p = .05) are significant predictors for job satisfaction. Regarding the last variable studied, no significant results for PsyCap to explain variance in organizational commitment were calculated. Overall, according to Cohen (1988), the results show a strong variance explanation of work engagement and job satisfaction by PsyCap at all measurement points.



Note. ** = p <.01

Figure 3-16. PsyCap Model Overview with relevant work-related Variables for EG 1 at T1 and T2.

To conclude, the results from hypotheses 2 and 3 show significant positive correlations between PsyCap and job satisfaction as well as between PsyCap and work engagement at both measurement points. They range from low to high correlations. Furthermore, there were no statistically significant correlations between PsyCap and organizational commitment at the two measurement points. Regarding the multiple regression analysis, 36.8% (R^2 = .368) of the variance in job satisfaction (JS) was explained by PsyCap at T1 and 51.8% at T2. Furthermore, 48.5% (R^2 = .485) of the variance in work engagement (WE) was explained by PsyCap at T1 and 60% at T2. Lastly, no significant results for PsyCap to explain variance in organizational commitment (OC) were measured. All the inferential statistical analyzes have been presented now. With such an innovative approach, it is of course interesting to evaluate the gamified online training itself. In the following, it is presented, among other things, how the participants liked the training and what suggestions for improvement they had.

3.3.5 Post-Training Evaluation

The study participants of EG 1, the gamified online training *HERO of the Jungle*, had the opportunity to give feedback regarding the intervention measure after the second time of measurement. In detail, they were asked to answer five closed training questions (see Appendix B, Evaluation) which corresponded to the first and second level of evaluation (i.e., reaction of the trainees and their thoughts about the training and the trainee's learning results and increase in knowledge) in line with Kirkpatrick (1979). Accordingly, questions were asked about the recommendation of the training, course activities, and content relevance. Furthermore, the participants were able to express their experiences with the HERO training by commenting in an open reply format in the survey which also addressed the first and second level of evaluation in correspondence to Kirkpatrick (1979). The comments were analyzed and different categories were constructed for each comment. In addition, it was possible that more than one category appeared in the individual comments from the feedback. As the evaluation questionnaire was voluntary, not every participant answered all statements.

The first evaluation question measures whether the participants would recommend the gamified online training to others. As can be seen in Figure 3-17, 37% of the participants somewhat agreed to propose the learning offer to others. Additionally, 30% of the colleagues agreed suggesting the online training further. More than one tenth (11%) of the users strongly agreed to recommend the gamification course to a friend or colleague. Next, 5% of the participants strongly disagreed and 7% disagreed to recommend *HERO of the Jungle* to a friend or colleague. Moreover, 11% of the gamified learners somewhat disagreed to recommend the online training to others. In sum, 41% of the training participants would recommend the gamified online training to a friend or colleague and 37% of the participants would rather recommend it.

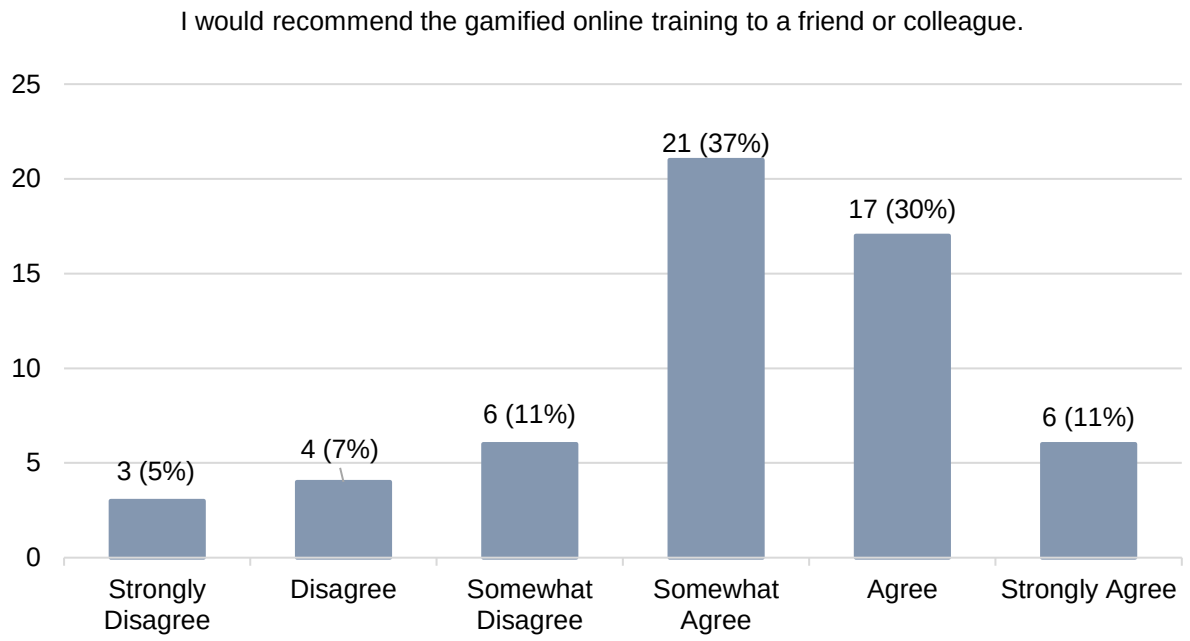


Figure 3-17. Recommendation of Gamified Online Training.

Regarding a good balance between theoretical and practical learning activities (see Figure 3-18), one third of the users somewhat agreed, 30% of the individuals agreed and 21% strongly agreed to the statement. Solely 7% of the participants strongly disagreed while an additional 9% of the online trainees somewhat disagreed to this statement. To summarize, 51% of the players found the theoretical and practical learning activities balanced and one third found the learning activities rather balanced.

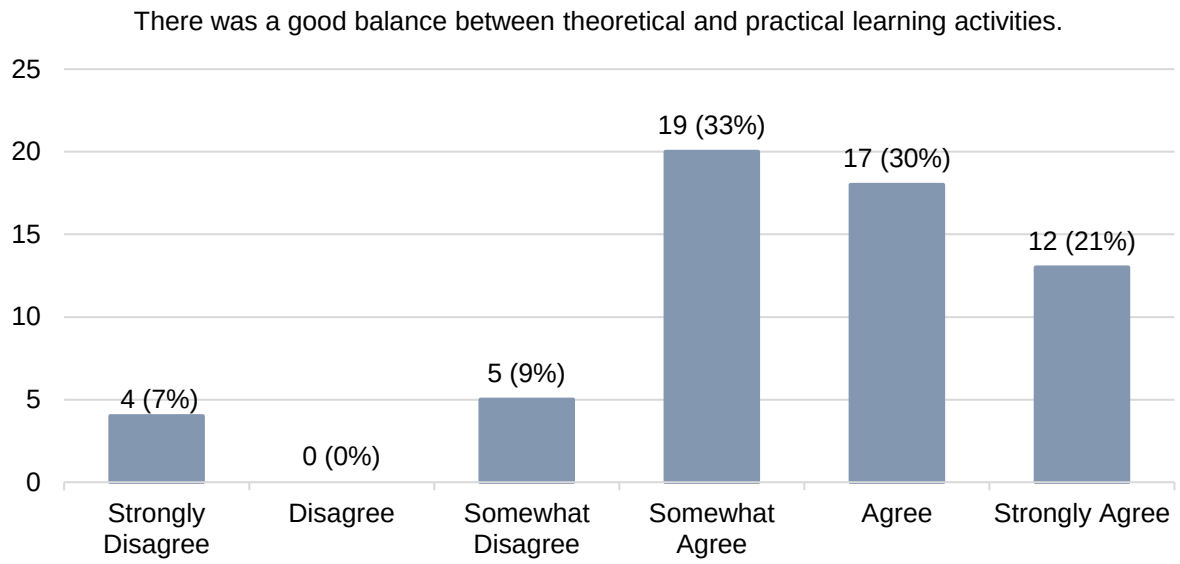


Figure 3-18. Balance of Gamified Online Training Activities.

Concerning a good suitability of the presentation and exercises to convey the content which is illustrated in Figure 3-19, one third of the learners somewhat agreed, 30% of the participants agreed and 14% of the individuals strongly agreed with the statement. Furthermore, 7% of the users both strongly disagreed and somewhat disagreed that the presentation and exercises were suited to convey the content. Additionally, 9% of the learners disagreed to the statement. In conclusion, 44% of the gamified learners found that the exercises were well suited to convey the content and 33% found them rather well suited.

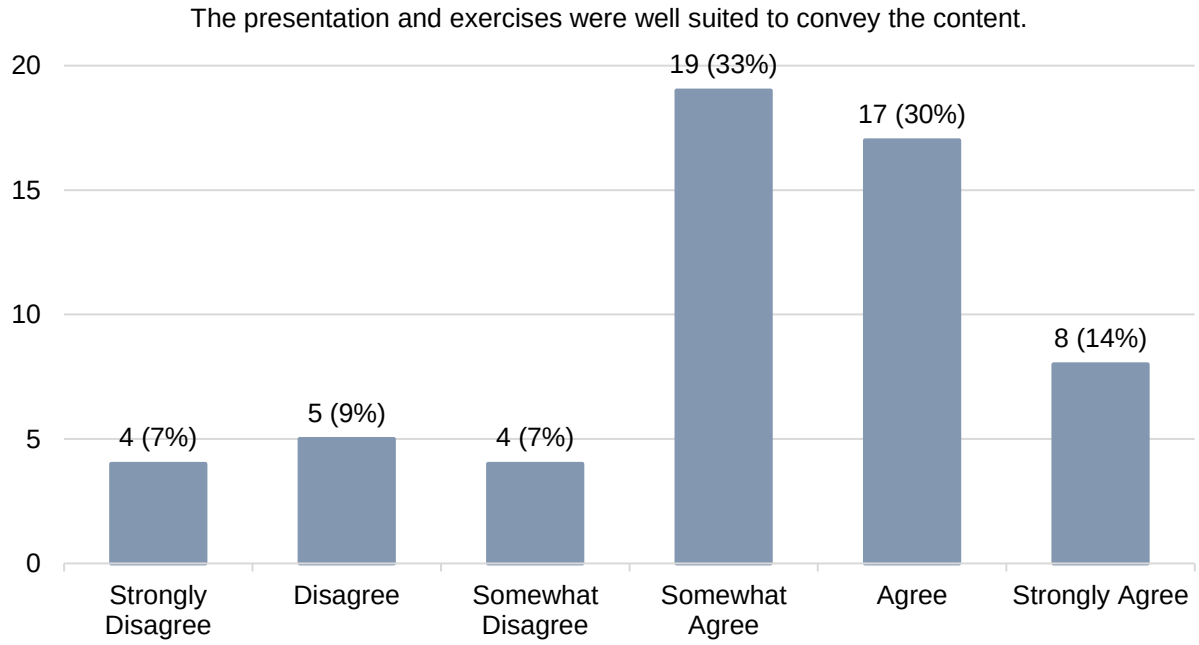


Figure 3-19. Suitability of Gamified Online Training Content.

The next evaluation question deals with the format and design of the gamified online training *HERO of the Jungle* (see Figure 3-20). 18% of the participants somewhat agreed to the statement. Besides that, 30% of the individuals agree that they liked the format and design of the gamified learning. Furthermore, more than one fifth (21%) of all participants strongly agreed to the statement. Conversely, 12% of the participants strongly disagreed and 14% of the individuals somewhat disagreed when asked if they liked the format and design of the gamified online training. Merely 5% of the users disagreed that the presentation and exercises of *HERO of the Jungle* were well suited. In sum, 51% of the participants liked the format and design of the gamified online training and 18% of the participants rather liked it.

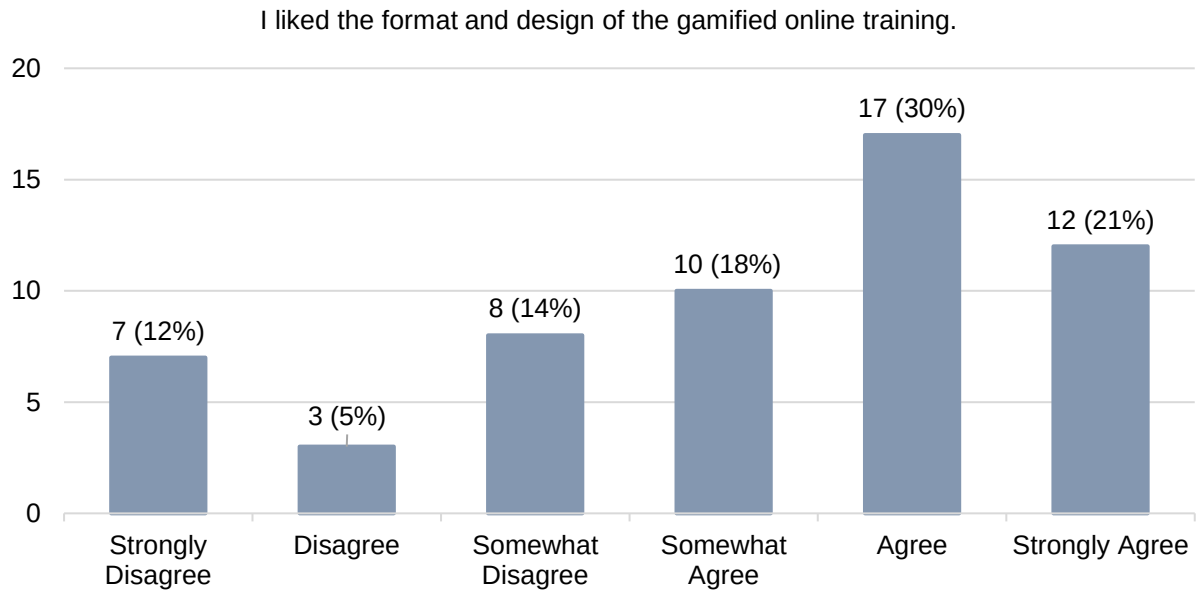


Figure 3-20. Gamified Online Training Format and Design.

The last evaluation question contained the transfer of the learning content into the job (see Figure 3-21). 32% of the players somewhat agreed to being able to apply what they learned to their job. Furthermore, 24% of the participants acknowledged to being able to implement the training content. Additionally, 14% of the participants strongly agreed to being capable of applying what they learned to their daily work. Conversely, 7% of the attendants strongly disagreed and 11% of the individuals disagreed to being able to apply the learning content. Finally, 12% of the users somewhat disagreed to being capable to put the learning content into practice at work. In sum, 38% of the players see themselves able to apply what they have learned to their job and 32% of them rather see themselves able to apply the learning content.

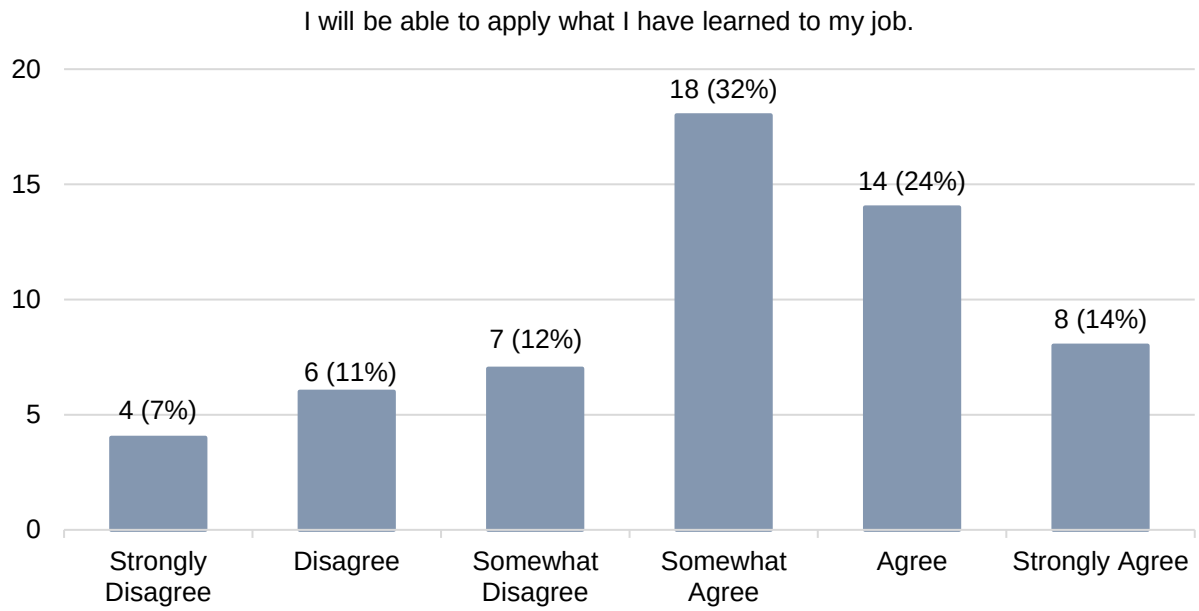


Figure 3-21. Application of Gamified Online Training Content.

The next section deals with the description of the five open questions of the gamified online training evaluation (see Appendix B, Evaluation). The participants were asked to give feedback on their personal learning experience at the end of the course. The answers to the open feedback questions were voluntary. Therefore, each question has a different number of data sets. For the sake of simplicity, the answers were categorized. The first open question dealt with what the participants liked most about the gamified online training *HERO of the Jungle* (see Figure 3-22). With 9 responses out of N = 22 data sets, 40% of the feedback providers made a positive reference to the gamification concept, 18% of them liked the overall concept of the course. Furthermore, 14% of the feedback givers liked the learning activities, the design of the gamified online training as well as the psychological content.

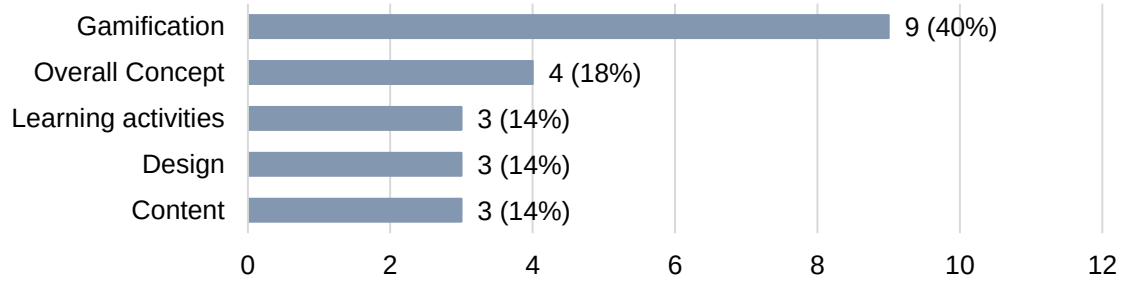


Figure 3-22. What Participants liked most about Gamified Online Training.

Secondly, the participants were asked what suggestions for improvement they had for the gamified online training which is displayed in Figure 3-23. Most comments dealt with the technical set-up of the gamified online training. With 11 responses out of the N = 28 data sets, 39% of the feedback providers suggested to improve the technical set-up, because they had difficulties with the performance of the

gamified online training. Moreover, 32% of the feedback givers would improve the quiz questions, because they were too difficult to answer. Besides that, one tenth of the feedback providers had no suggestions to improve the gamified online training because they liked everything how it was. Additionally, 7% of the feedback givers proposed to improve the gamification approach. Solely 4% of the feedback givers recommended to improve the design, the teamwork function, and the content of the gamified online training.

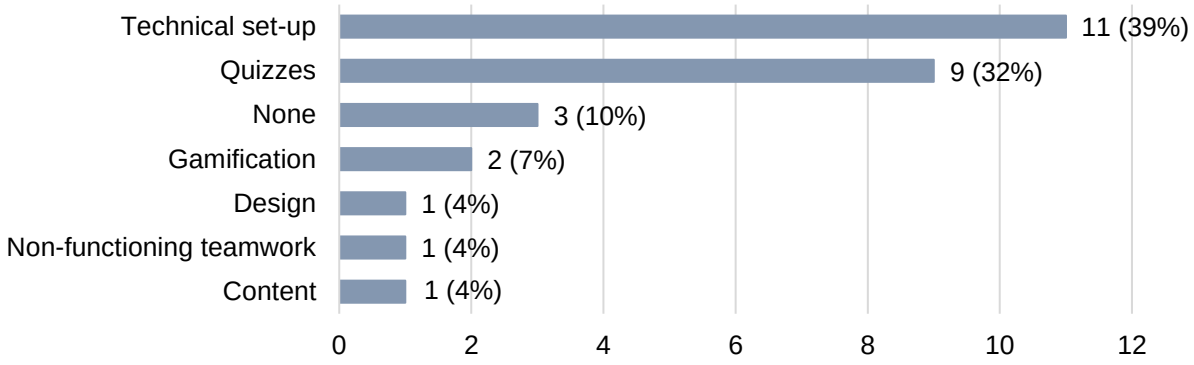


Figure 3-23. Suggestions for Improvement for Gamified Online Training.

Thirdly, the participants were asked what exactly they had learned in the gamified online training (see Figure 3-24). With 6 responses out of the N = 18 data sets, one third of the feedback providers learned how to develop positive psychological capacities. Furthermore, 17% of the feedback givers both learned how to set individual goals and applied self-reflection throughout the online training. On the other hand, 17% of the feedback providers stated that they had learned nothing in the online training. Conversely 5% of the feedback givers learned something about positivity, mental agility, and that the company invests in soft skills.

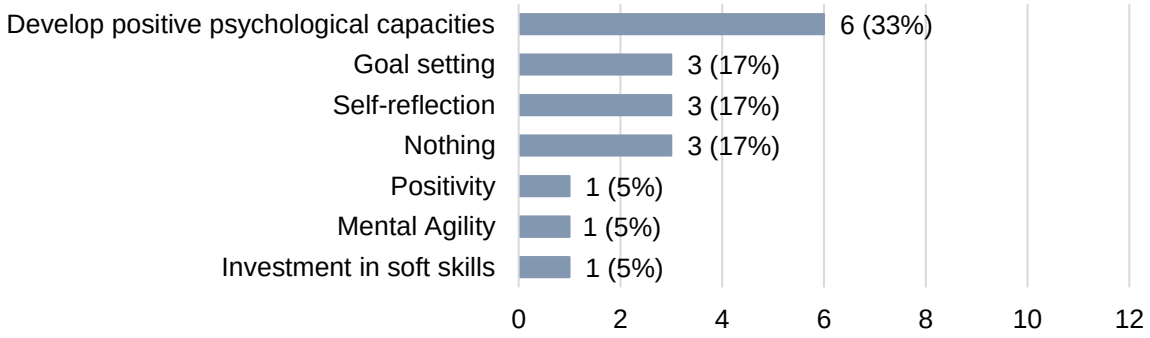


Figure 3-24. What Participants learned from Gamified Online Training.

The fourth evaluation question accentuates if the individuals remembered especially interesting or exciting videos, tasks or quizzes which is illustrated in Figure 3-25. And if so, they were asked why they remembered them. The intention behind the question is to find out what the individuals kept in mind from the gamified online training that caught their attention. With 4 responses out of the N = 15 data sets,

27% of the feedback providers remembered the learning content that they applied during the gamified online training. Furthermore, 13% of the feedback givers remembered the differentiation between optimism and pessimism from Seligman's video in the basic level of the optimism chapter. Moreover, the same amount of the feedback providers remembered the videos on hope, all videos, and the quizzes because they were interesting and caught their attention. Besides that, 7% of the feedback providers remembered topics around happiness, resilience, and the videos about self-efficacy.

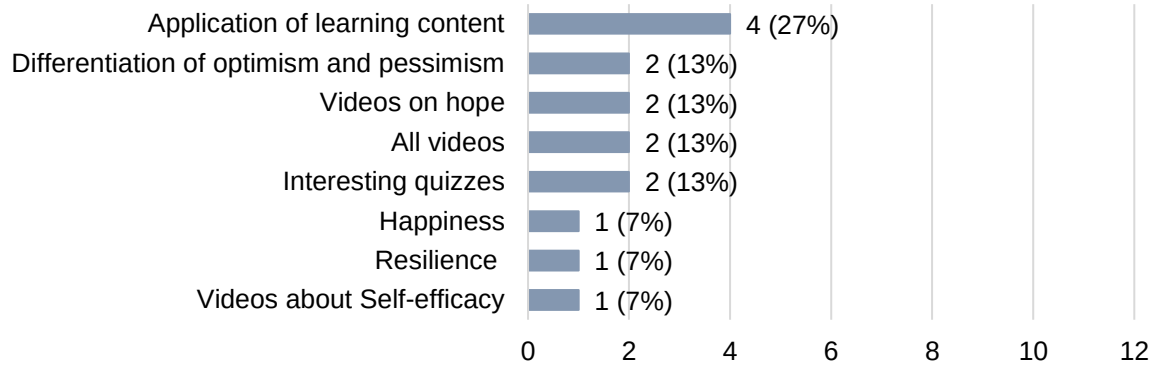


Figure 3-25. What Participants remembered from Gamified Online Training.

Finally, the gamified learners were asked about reasons behind not reaching the target of 250 XP (see Figure 3-26), meaning that they did not play the gamified online training until the end. With 12 responses out of the N = 29 data sets, 41% of the feedback providers mentioned time constraints. Furthermore, 24% of the feedback givers had technical issues to get onto the platform and with individual chapters of the gamified online training. In addition, 14% of the feedback providers left the gamified online training for reasons regarding the learning content, which was not of interest to them. Furthermore, 7% of the feedback givers reported difficulties to pass the quizzes and did not like the overall concept of the gamified online training. Finally, 3% of the feedback providers left the gamified online training, because learning was not a top priority and they did not like the gamification approach.

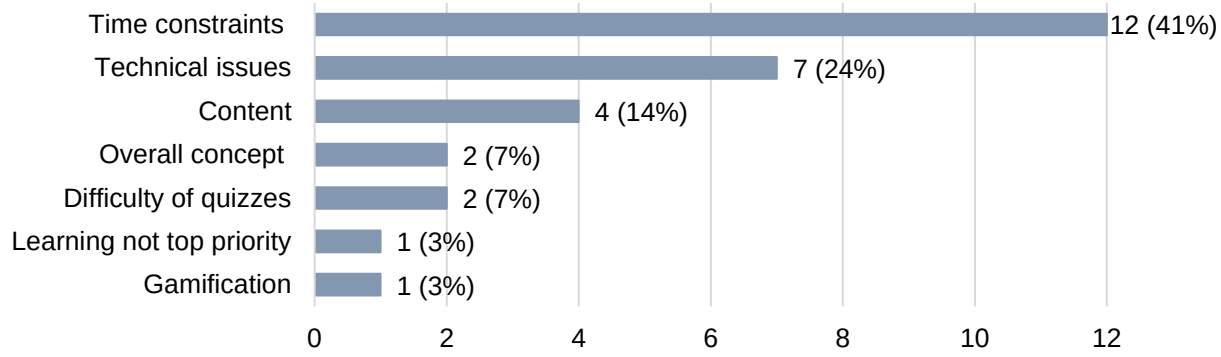
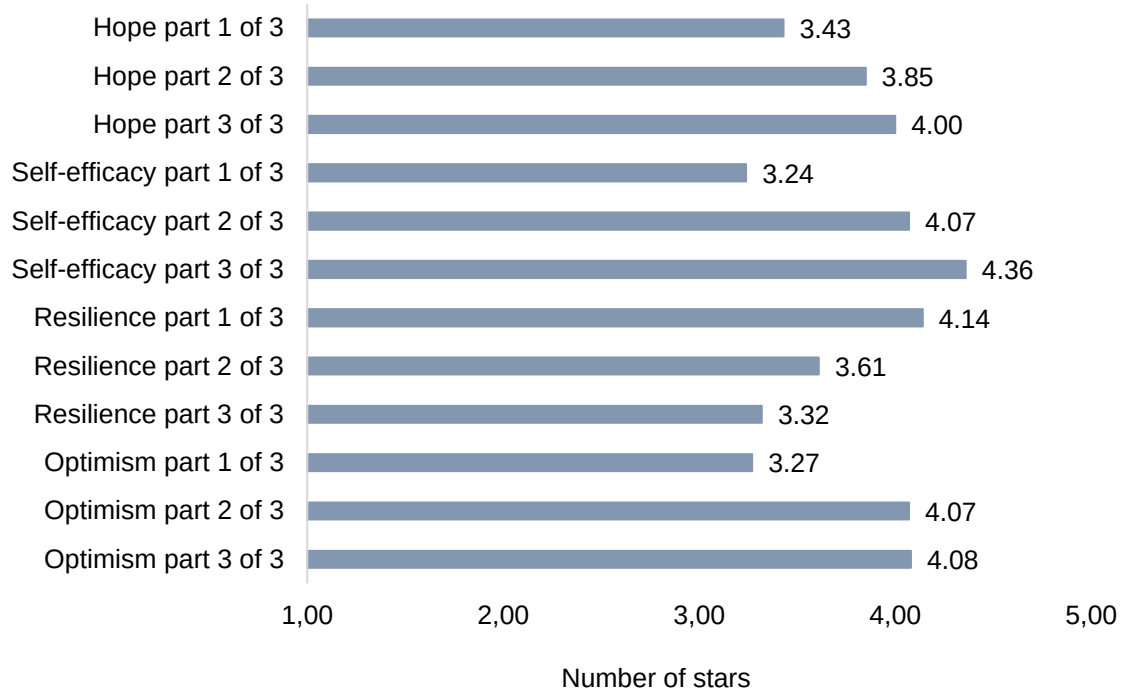


Figure 3-26. Reasons for quitting Gamified Online Training.

In addition, the participants of the gamified online training *HERO of the Jungle* had the possibility to rate each of the twelve chapters by awarding 1-5 possible stars for the respective chapter. The stars were awarded for the learn section (videos, articles, infographics), the practice section (handouts for self-reflection), and the topic-specific quiz question (focusing either on self-efficacy, hope, resilience, or optimism) of each chapter. The bonus quiz questions were not included in the evaluation because they were not related to the PsyCap content and only placed after the stars had been awarded. To award one star meant that the participants did not like the chapter at all and five stars indicated that they liked the chapter very much. A detailed overview on the numbers of stars awarded per chapter from all participants who were registered on the gamified online platform (*N* = 261) and rated the respective chapters is shown in Appendix H. Since EG 1 could not be filtered out of the chapter rating, more participants are listed in the table than in the actual training. The chapter Hope part 1 of 3 was the most rated chapter (see Appendix H). This was due to the fact that the gamified online training started at this chapter. Moreover, the chapter Self-efficacy part 1 of 3 was the second most rated (41 stars). The least rated chapters were the Self-efficacy part 3 of 3 (11 stars) and Hope part 3 of 3 (12 stars) chapters. In order to be able to interpret the data in more detail, Table 3-15 indicates the average rating per chapter of all registered participants on the gamified online platform.

Table 3-15

Average Rating per Chapter in Gamified Online Training



Note. 1 star: Participants do not like the training content at all, 5 stars: participants like the training content a lot.

The best-rated chapter in *HERO of the Jungle* was Self-efficacy part 3 of 3 (*M* = 4.36; *SD* = .81) followed by Resilience part 1 of 3 (*M* = 4.14; *SD* = 1.03). The “worst-rated” chapter was Self-efficacy part 1 of 3 (*M* = 3.24; *SD* = 1.09) followed by optimism part 1 of 3 (*M* = 3.27; *SD* = 1.16) which is still a relatively

high rating of stars awarded for the chapters. The average rating of all twelve chapters in the gamified online training resulted in *M* = 3.80 (*SD* = 1.13). This means that the PsyCap learning content was rated with 4 out of 5 possible stars by the participants on average.

In summary, the majority of the participants would recommend the gamified online training to a friend or colleague, they found the theory and practice balanced, and stated that the exercises were well suited to convey the content. They liked the format and design of the HERO training and also see themselves as being able to apply what they learned to their daily job. The majority of the participants liked the overall and gamification concept, however, they propose improving the technical set-up and the quizzes. Finally, the participants learned to develop positive psychological capacities and remembered the learning content as they directly applied it in the training. Reasons for not continuing the gamified online training were time constraints and technical issues. In addition, the PsyCap learning content was rated very well with an average rating of 4 out of 5 possible stars from all participants (*M* = 3.80; *SD* = 1.13). This chapter concludes the overall results of the gamified online training and in the next chapter the results are summarized.

3.3.6 Summary of Results

One of the goals of this dissertation was to investigate if PsyCap as a core construct can be enhanced in the workplace of a multinational software corporation through a gamified training program based on the four components hope, self-efficacy, resilience, and optimism. A total of 261 participants from EG 1 (out of a potential of 14,877 members in the internal social network of the company; response rate: 2%) took part in the online survey at the first time of measurement (T1, before the training) and 57 participants at the second time of measurement (T2, directly after the training; response rate: 22%). No data were available for the online survey at the third measurement date due to technical difficulties in the HERO training in terms of opening the gamified online platform with the correct browser as well as opening a learning chapter by zooming into the eyes of the respective animal. Regarding the control group (CG), 1,205 employees were contacted via e-mail and 219 participants (response rate: 18%) completed the online survey at T1. As in EG 1, 57 individuals filled in the survey at T2 which corresponds to a response rate of 26%. Accordingly, the sample size was equally distributed in both groups. T-test analysis showed that drop-outs from EG 1 did not differ significantly from the rest of the participants in the measured variables at T1, except that drop-outs showed higher levels of organizational commitment ($t(259) = 4.82$; $p = .00$). Furthermore, drop-outs from CG 1 did not differ significantly from the rest of the CG in the measured variables at T1, except that drop-outs showed higher values in work engagement ($t(232) = 2.07$; $p = .04$). Overall, the socio-demographic data collected (i.e., region of work, age, education, employment status, and years of service with the company) was consistent with the image of the workforce. However, when it comes to gender, the numbers are different. In the study, the proportion of women (56%) was slightly higher than the proportion of men (42%), while in the overall development organization, the ratio between men and women is closer to 70% to 30%. The reliability of all scales (i.e., PsyCap, work engagement, job satisfaction, and organizational commitment) in the online survey can be considered sufficient (Bortz & Döring, 2016). The mean values of the PsyCap scales at T1 and

T2 were consistently high in both groups ($M \geq 4.17$). All PsyCap scales, including PsyCap itself, showed a positive trend in their mean scores between T1 and T2.

The statistical analysis of hypothesis 1 showed a significant main effect for PsyCap ($F(1,112) = 4.54$; $p = .036$; $\eta^2 = .041$). This means the PsyCap scores changed over time, but there was no significant difference between the groups. Therefore, there was no significant interaction effect for PsyCap with the group and hypothesis 1 must be rejected. Concerning the PsyCap elements (hypotheses 1a-1d), a significant main effect for self-efficacy ($F(1,112) = 7.51$; $p = .007$; $\eta^2 = .066$) and resilience ($F(1,112) = 7.20$; $p = .008$; $\eta^2 = .064$) was detected. This means the self-efficacy and resilience scores changed over time, but there was no significant difference between the groups. In addition, there were no significant interaction effects for the PsyCap components with the group. As a result, hypotheses 1a – 1d must be rejected. When the participants were split into high and low engagement in the gamified online training, there was a significant interaction effect for overall PsyCap when controlled for gender. According to the significant interaction effect, after the gamified online training, men had a higher increase in PsyCap in the low-engaged group compared to women, while women had a higher increase in PsyCap in the high-engaged group compared to men. The effect can be considered a weak effect.

The statistical analysis of hypothesis 2 revealed a statistically significant correlation between PsyCap and job satisfaction (JS) at both measurement points which can be interpreted as a low correlation at T1 and a medium relationship at T2 (Zöfel, 2003). Hypothesis 2 can therefore be confirmed. The statistical analysis of hypothesis 3 revealed a statistically significant correlation between PsyCap and work engagement at T1 and T2 which can be interpreted as a medium relationship at T1 and a high correlation at T2 (Zöfel, 2003). Consequently, hypothesis 3 can be confirmed. The statistical analysis of hypothesis 4 displayed no statistically significant correlations between PsyCap and organizational commitment (OC) at T1 and T2. Nonetheless, a statistically significant correlation was found between PsyCap at T1 and OC at T2 which, according to Zöfel (2003), can be considered a very low correlation. However, hypothesis 4 must be rejected.

Further analyzes (i.e., multiple regression analyzes) demonstrated the impact of PsyCap on significant work-related variables such as job satisfaction, work engagement, and organizational commitment. Accordingly, 37% of the variance in JS at T1 and 52% of the variance at T2 was explained by PsyCap. Almost 50% of the variance in WE at T1 and 60% of the variance at T2 was explained by PsyCap. Finally, no significant results for PsyCap to explain variance in OC were measured. In sum, according to Cohen (1988), the results show a strong variance explanation of work engagement and job satisfaction by PsyCap at all measurement points.

Altogether, the gamification elements such as the badges and the team function were infrequently used in the HERO training. On the other hand, the chapter rating with an average rating of $M = 3.80$ for all twelve chapters was more accepted. This means that the PsyCap learning content was rated very well with 4 of 5 stars by the participants.

Overall, the majority of the participants would recommend the gamified online training to a friend or colleague, found the theoretical and practical learning activities balanced, and stated that the exercises were well suited to teach the PsyCap content. Finally, the participants liked the format and design of the HERO training and saw themselves rather as being able to apply what they have learned to their job.

Furthermore, the majority of the participants liked the gamification and the overall concept. However, they suggest improving the technical set-up and the quiz question. In sum, they learned to develop positive psychological capacities and remembered the learning content because they directly applied it in the PsyCap training. Reasons for not continuing the HERO training were time constraints and technical issues. The next chapter illustrates the discussion of the results from the first study and provides implications for future research and practice.

3.4 Discussion

In the following, the results of study 1 are discussed and interpreted (see 3.4.1) The methodological strengths and limitations of the present study 1 are shown (see 3.4.2) and implications for future research and practice in this area are presented (see 3.4.3).

3.4.1 Discussion and Interpretation of the Results

The purpose of this study was to determine whether a gamified online training could be effective in human resource development of PsyCap in the workplace of a multinational software corporation. Particularly, it was intended to measure whether PsyCap as a core construct can be enhanced in the workplace through a 4-hour gamified online training focusing on the four components of hope, self-efficacy, resilience, and optimism. This study also sought to provide more precise insights into gamified training approaches as such by comprehensively evaluating the PsyCap intervention measure.

Discussion of Hypotheses

According to the first hypothesis, there was a significant change in PsyCap ($F(1,112) = 4.54$; $p = .036$; $\eta^2 = .041$). According to Pospeschill (2006) the effect can be regarded a medium effect. The PsyCap mean value in EG 1 increased slightly over time (M_{T1}: = 4.37; $SD_{T1} = .53$; $M_{T2} = 4.65$; $SD_{T2} = .54$) while the PsyCap mean value in CG 1 decreased slightly over time ($M_{T1} = 4.61$; $SD_{T1} = .63$; $M_{T2} = 4.56$; $SD_{T2} = .70$). The main effect PsyCap*Group did not become significant ($F(1,112) = 1.16$; $p = .28$; $\eta^2 = .011$). That means, whether a participant has done the PsyCap training or not did not make a difference. In terms of the demographic information, it should be noted that neither age, gender, nor education did relate significantly to PsyCap which is consistent with earlier results showing that they are hardly associated with PsyCap, and if they are related, the relationship is not uncommonly weak (Avey, 2014). Nevertheless, hypothesis 1 must be rejected, because the interaction effects did not show any significant results. The analysis of sub-hypothesis 1a showed a significant effect for self-efficacy ($F(1,112) = 7.51$; $p = .007$; $\eta^2 = .066$). The effect can be regarded a medium effect (Pospeschill, 2006). The self-efficacy mean value in EG 1 increased slightly over time ($M_{T1} = 4.38$; $SD_{T1} = .84$; $M_{T2} = 4.61$; $SD_{T2} = .81$) while the self-efficacy mean value in CG 1 stayed the same ($M_{T1} = 4.81$; $SD_{T1} = .78$; $M_{T2} = 4.81$; $SD_{T2} = .77$). The analysis of hypothesis 1c revealed a significant effect for resilience ($F(1,112) = 7.20$; $p = .008$; $\eta^2 = .064$). The effect can be regarded a medium effect as well (Pospeschill, 2006). The mean value in resilience in EG 1 showed a slight increase over time ($M_{T1} = 4.55$; $SD_{T1} = .56$; $M_{T2} = 4.80$; $SD_{T2} = .57$) while the mean value in resilience from CG 1 slightly decreased over time ($M_{T1} = 4.60$; $SD_{T1} = .65$; $M_{T2} = 4.55$; $SD_{T2} = .73$). However, both results were not related to the group nor to any interactions effects.

Therefore, all sub-hypotheses need to be rejected which is in contrast to the expectations. The results of the hypotheses were not line with previous research findings that reported significant increases in PsyCap with a small effect size (d = .19) for PsyCap online trainings (Luthans et al., 2008). A potential reason for these results might be that CG 1 had already dealt with the topics of the online questionnaire in advance and had therefore higher mean values. Another reason might be that the questionnaire itself already acted as a treatment.

Furthermore, when participants were split into high and low-engaged in the gamified online training (see Appendix G), there was a significant interaction effect for PsyCap when controlled for gender ($F(1,55) = 4.30$; $p = .044$; $\eta^2 = .080$). The effect can be considered a weak effect (Pospeschill, 2006). A closer look at the PsyCap mean values revealed that for low-engaged participants (level 1, 0 - 49 XP), men ($M_{T1} = 4.33$; $SD_{T1} = .62$; $M_{T2} = 4.62$; $SD_{T2} = .63$) showed larger increases in PsyCap over time compared to women ($M_{T1} = 4.44$; $SD_{T1} = .45$; $M_{T2} = 4.53$; $SD_{T2} = .54$). For high-engaged participants (level 2-5, 50 - ≥250 XP), women ($M_{T1} = 4.19$; $SD_{T1} = .51$; $M_{T2} = 4.73$; $SD_{T2} = .45$) showed larger PsyCap increases over time compared to men ($M_{T1} = 4.63$; $SD_{T1} = .43$; $M_{T2} = 4.82$; $SD_{T2} = .46$). Consequently, according to the data, men benefited more from the gamified online training in the low-engaged group while women benefited more from the training in the high-engaged group. However, men in the high engaged group had a higher baseline level than women and overall, the differences in the PsyCap mean values between men and women in the high and low-engaged group were only marginal. In general, in a male-dominated industry or company, it is suspected that men would have a higher PsyCap. When looking at PsyCap and its relationship with gender, it is assumed that women entering this company or industry would require a higher PsyCap, and therefore women in such companies would generally have a higher PsyCap (Avey, 2014). However, the demographic results showed that although there were more men in the development organization, women were more likely to feel addressed by psychological resource training topics than men.

Overall, several of the hypotheses (i.e., hypotheses 1, 1a-1d) proposed in this study were not supported although previous studies have provided initial evidence in support of this premise (Da et al., 2020; Dello Russo & Stoykova, 2015; Luthans et al., 2008; Luthans et al., 2010). There are four potential reasons why the current study did not confirm previous findings. First, although the observed mean scores for hypothesis 1 and hypotheses 1a – 1d did move in the proposed direction from the pre-test to the post-test, further analysis failed to find a statistically significant difference in support of either of these hypotheses. High scores at the time of the pre-test indicate the possibility of a ‘ceiling’ effect which allowed a limited opportunity for the ratings to increase from pre-test to post-test. A ‘ceiling’ effect can be defined as “a term used to describe what happens when many subjects in a study have scores on a variable that are at or near the possible upper limit (‘ceiling’). Such an effect may cause problems for some types of analysis, because it reduces the possible amount of variation in the variable (Vogt & Johnson, 2015, p. 56). Therefore, the examination of the pre-test data for the PsyCap levels indicated the possible existence of a ceiling effect. The high PsyCap scores at T1 may be due to the fact that the participants may have exhibited relatively high positive expectations of the training at baseline. Second, in this investigation, participants were able to register voluntarily for the HERO training. Anyone who wanted could join, which means that the participants were already interested in the topic itself.

Therefore, self-selection bias played a role when the participants assigned themselves to the training. Third, the tendency of the study participants to answer the questions in the online survey in a socially desirable way could be another confounding variable in this study. This may have led the participants to choose a more positive response category. Fourth, self-reporting data was applied in the study. The use of self-reporting methods to measure all variables may have led to common method bias. Additional measurements such as objective data or peer assessments could have reduced such bias. However, since the variables in this study were subjective in nature, they were probably best assessed through self-reporting (Spector, 2006). Consequently, multi-rater methods would have been an unsuitable method to measure these variables.

The *HERO of the Jungle* training was developed with a clear vision, namely, to develop positive psychological resources in the workplace. However, it was not systematically investigated to what extent the design of the gamified online training could have influenced the completion rates of the participants. Only about one-third of well-designed and executed experiments that were designed to enhance a key metric were successful to the achievement of the corresponding key metrics (Kohavi et al., 2009). This means that two-thirds of well-designed and executed experiments are not successful in addressing the desired key metrics. A major challenge of open eLearning courses is maintaining the initial motivation of the participants throughout the course. According to Jordan (2015), it is common practice that only about 15% of the participants actually complete a course successfully. Employees who start a course but do not complete it due to insufficient commitment, is doubly damaging. Firstly, the benefit of investing in the course is reduced and secondly the employee's paid working hours do not lead to any increase in knowledge. The implementation of gamified technologies requires not only the respective technology with different applications, elements, and actors, but also skilled employees with practical knowledge of such procedures. With this sample in particular, one would have to assume that the employees possess a high affinity for technology. However, it is possible that some employees felt overwhelmed with the gamified online training and thus broke off the training.

Based on the conservation of resources (COR) theory (Hobfoll, 2002), not only the effectiveness of this PsyCap intervention was examined, but also its influence on important work-related attitudes: work engagement, job satisfaction, and organizational commitment. This study also sought to provide more precise insights into the mechanisms of effect of PsyCap in relation to these important work-related constructs. It was investigated whether PsyCap was relevant in explaining variance in these outcome variables (hypothesis 2-4). As a result, there was a significant positive relationship between PsyCap and work engagement at T1 ($r = .75$, $p < .01$) and T2 ($r = .66$, $p < .01$). This means high values in PsyCap corresponded to high values in work engagement. Hence, individuals with high PsyCap levels appear to be more engaged at work. These results confirm previous studies that found a significant relationship between PsyCap and work engagement (Joo et al., 2016). In addition, the findings of the multiple regression analysis showed that hope ($\beta = .273$, $p < .05$), self-efficacy ($\beta = .407$, $p < .05$), and optimism ($\beta = .266$, $p < .05$) were significant predictors of work engagement. This suggests that the degree to which employees expect positives outcomes and attribute these outcomes as internal, permanent causes (optimism) is mainly important in determining the extent to which they feel engaged at work.

These results contribute to previous results where Othman and Nasurdin (2011) found that hope is a predictor of work engagement. In addition, the findings contribute to previous findings where Bakker, Gierveld, and van Rijswijk (2006) found in their study of school principals that resilience, self-efficacy, and optimism contributed to work engagement and could explain unique variance in engagement values. Likewise, a positive significant correlation between the participant's PsyCap and their job satisfaction at T1 (r = .45 p < .01) and T2 (r = .62, p < .01) was measured. This means high values in PsyCap corresponded to high values in job satisfaction. Consequently, the data suggest that individuals with high levels of PsyCap are more satisfied with their jobs. These results confirm previous studies that have shown a relationship between PsyCap and job satisfaction (Abbas et al., 2014; Luthans, Avolio et al., 2007). Additionally, the results from the multiple regression analysis showed that optimism (β = .492, p = .05) and hope (β = .603, p = .05) were significant predictors of job satisfaction. This is consistent with previous research showing that individuals with higher levels of optimism are less likely to experience the effects of workplace stress (Totterdell et al., 2006). In contrast to the results of previous studies (Jensen & Luthans, 2006; NGUYEN & NGO, 2020), there was no significant relationship between PsyCap and organizational commitment (OC) in the present study. However, when analyzed with the OC subscales, there was a significant positive correlation between PsyCap and the affective commitment scale (ACS) at both measurement points (see Appendix M.1 for further details) which means that the more PsyCap a person has, the higher the values on the ACS. Hence, the likelihood that people will stay with the organization because they want to (i.e., emotional attachment to, and identification with the organization) is high. In addition, the significant negative correlation between PsyCap and the continuance commitment scale (CCS, one of the OC subscale) at T1 (r = .31, p < .05) means that the more PsyCap a person has, the lower the values on the continuance commitment scale. Thus, the likelihood that people will stay with the company because they have to (i.e., costs employees associate with leaving the company) is low. Finally, the significant positive correlation between PsyCap and the normative commitment scale (NCS) at T1 (r = .16, p < .05) means that the more PsyCap a person has, the higher the values on the NCS. Therefore, the likelihood that people will stay with the company because they ought to (i.e., employees' feelings of obligation to remain with the organization) is high. However, the results are only valid for the first measurement point and not for T2. In sum, opposed to previous research findings (Jensen & Luthans, 2006; NGUYEN & NGO, 2020), there is no significant relationship between PsyCap and employee's overall organizational commitment. However, when split into the OC subscales there are significant relationships between PsyCap and all the three subscales. To the author's knowledge, the relationship between PsyCap and the individual OC subscales has not yet been studied and the literature is still deficient. Accordingly, this study contributes to the previously unclear research situation between PsyCap and the OC subscales. Moreover, the multiple regression analysis showed that there were no significant results for PsyCap to explain variance in organizational commitment. These findings are not in alignment with other research which has investigated the relationship between PsyCap and organizational commitment (Jensen & Luthans, 2006; NGUYEN & NGO, 2020) as well as the relationship between hope and organizational commitment (Larson & Luthans, 2006a; Youssef & Luthans, 2007).

In sum, the analysis of hypothesis 2 and 3 revealed significant positive correlations between PsyCap and job satisfaction as well as between PsyCap and work engagement at both measurement points ranging from low to high correlations and could therefore be confirmed. There were no statistically significant correlations between PsyCap and organizational commitment at the two measurement points and therefore hypothesis 4 needed to be rejected. The results of the statistical analyzes to answer the hypotheses have now been discussed. The next section focuses on a methodological discussion of the three main quality criteria of psychological diagnostics: objectivity, reliability, and validity.

Discussion of Objectivity, Reliability, and Validity

The objectivity of questionnaire studies can generally be considered high, since there are clear guidelines regarding the implementation, evaluation, and interpretation (Bortz & Döring, 2016). The reliability of the questionnaires used in this study was primarily examined with regard to the internal consistencies of the scales. Reported reliability alphas for PsyCap in the PCQ-24 (mentioned in 22 studies) range between .75 and .95 (see Dawkins et al., 2013). In this study reliability alphas for PsyCap range between .87 and .93 (for both EG 1 and CG 1) which is slightly higher than in some of the reported studies by Dawkins et al. (2013). Concerning the reliability alphas for the individual PsyCap elements, the review by Dawkins et al. (2013) reports internal consistencies for hope (α = .70 - .87), self-efficacy (α = .70 - .92), resilience (α = .63 - .66), and optimism (α = .63 - .69). In this study, the internal consistencies for the PsyCap components are the following for hope (α = .76 - .88), self-efficacy (α = .78 - .84), resilience, (α = .65 - .82), and optimism (α = .64 - .80). Accordingly, similar results are recorded in this study for internal consistencies related to PsyCap and its elements, which contributes to the research literature. All other scales (work engagement, job satisfaction, and organizational commitment) are characterized by acceptable to high internal consistencies. Hence, the questionnaires used were reliable. In addition to objectivity and reliability, validity is the third main quality criterion of psychological diagnostics. A test can be considered valid if it also measures what it intends to measure (Kubinger, 2003). Since the items in the context of this study originate from questionnaires that have already been validated in their original form (see chapter 2.3), it can be assumed that the quality criterion of validity is fulfilled. The lack of randomization of the study participants to the study conditions (treatment vs. control group), however, reduces the internal validity. In addition, the general applicability (i.e., external validity) of the results of the samples may be limited. The participants from the study came from one development organization involved in specific work conditions and characteristics that may not be representative of the broader population. However, since the study was applied in the workplace, the heterogeneity of the sample may support the generalization of the results. In particular, the impact of a gamified online PsyCap intervention may not be limited to a specific organization, industry, or demographic group.

Discussion of PsyCap Training Evaluation

Regarding the evaluation of the gamified PsyCap training, two of the four levels from Kirkpatrick (1979) (i.e., reaction and learning) were applied. The third (i.e., behavioral change) and fourth level (i.e., results/ effects on business by trainee) of evaluation were not measured due to the missing measurement at T3 (corresponding to the third level of evaluation) and the strictly confidential data protection treatment of

company data (corresponding to the fourth level of evaluation. This reduced the significance of the study results. It should be noted that due to the open response format (i.e., voluntarily) of the evaluation questions, a distorted representation of reality due to self-selection of the evaluation questions cannot be ruled out. The data are therefore of limited informative value and should only be interpreted as an orientation. Overall, the participants would recommend the HERO training to a friend or colleague and found the theory and practice balanced. They stated that the exercises were well suited to convey the content and they liked the format and design of the gamified PsyCap training. The comments expressed in the feedback (see chapter 3.3.5) show that the participants generally experience the PsyCap intervention (PCI) as positive. However, they suggest improving the technical set-up and the quizzes. Second, the participants were asked what exactly they had learned in the gamified online training (see Figure 3-24). This question addresses the 'learning' component from Kirkpatrick's (1979) evaluation model and shows the learning results and increase in knowledge from the training. Overall, during the online training participants learned how to develop positive psychological capacities, set individual goals, and use self-reflection. However, a small number of respondents (18%) stated that they had learned nothing in the training. This was possibly reflected by those participants who broke off the gamified online training early and did not play through to the end. An important finding of the study is that the study participants stopped the gamified online training measure prematurely due to time constraints and technical problems (i.e., performance of the gamified online training platform) and therefore did not complete the training. The majority of the participants (63%) stayed at level 1 and therefore consumed only 20% of the overall PsyCap learning content. Thus, this argument equally supports the fact why the PsyCap intervention measure might not produce significant interaction effects in the measured values between EG 1 and CG 1. An important point that needs to be taken into account when discussing the effectiveness of the gamified online training *HERO of the Jungle* is with regards to completing the respective exercises. Measuring whether participants completed the respective tasks, and whether they spent the time for self-reflection was not possible, which somehow limits the interpretability of the effectiveness of the PsyCap intervention measure. The users could just click on the 'Done' button when they had performed a certain task. It was not known whether they had actually performed it or not. Furthermore, the gamification elements such as the use of badges, points, levels, and the team function were not frequently used. There was only one complete team with three members in the gamified online training (see chapter 3.3.2). In summary, there was little group interaction between the participants in the gamified PsyCap training which limited the social interaction between the employees.

3.4.2 Strengths and Limitations of Study 1 – Gamified Online Training

Finally, some strengths and limitations with regards to the methodological approach of the present study 1 need to be discussed. One major strength of the HERO training is the accessibility of the gamified online training platform. The participants of the gamified online course are flexible to learn the content, regardless of time zone, location, schedule, or team (size), which is not given in a classroom training format with fixed training dates. Another major strength of the gamified online training is the self-paced training approach, which provides additional possibilities for implementing PsyCap interventions in

workplaces. Moreover, online-based self-learning interventions enjoy the benefits of cost, convenience, and effectiveness, which can be applied to interventions in workplaces to promote employees' PsyCap and further Human Resource Development (HRD) (Da et al., 2020). Especially, the effectiveness of the study results, however, has not been clearly proven. While there is scientific evidence for the positive effects of gamification in general, there are still important discrepancies in the effectiveness of gamification across contexts and user groups (Hamari et al., 2014). The third major strength of the gamified online training lies in the visible and transparent learning progress and completion status. On the platform, the learning progress is tracked by the increasing number of experience points (XP's) and therefore higher levels that the participants receive once they have successfully completed a task (e.g., having completed an 'learn' or 'practice' chapter, a (bonus) quiz, or having rated a chapter). This gives the participants direct feedback on their actions in the PsyCap training. The completion status of an animal in the HERO training was indicated by connected lines between the different animals. Consequently, the participants were able to see individually which animals (i.e., PsyCap element) they have already completed.

However, at least four major and minor limitations of the present study must be acknowledged. The first major limitation lies in the lack of randomization of the study participants for EG 1 and CG 1. When people are randomly assigned to an experimental condition, it is expected that all potential confounding variables will have the same distribution in all experimental conditions. In organizational psychological studies, however, randomization of subjects is rarely possible, as whole working groups or teams are usually assigned to specific experimental conditions (Freund & Holling, 2007). In this investigation the study participants stem from the development organization of the software corporation. CG 1 consisted of members who worked in a different development unit than the participants from EG 1, but had the most overlap with job roles. The second major limitation is the low response and engagement rate. A reason for the low response rate might be explained by the fact that the individuals were not willing to commit to answering the comprehensive online questionnaire (68 questions in approx. 15 min). If the survey took too long for the participants or if they were interrupted (e.g., by a meeting or a call etc.), then it was possible that the survey got closed by mistake. The participants could have lost their patience and stopped the inquiry at some point before they were able to enter the gamified online platform. This is how most of the interruptions of the questionnaires might have occurred. One reason for the low level of involvement in the gamified training might have been technical issues on the gamification platform (i.e., difficulties with using the right browser and opening a learning chapter) which could be another reason for the low participation rate at the second measurement point. The third major limitation is the small sample size in the study with 57 participants from each group (EG 1 and CG 1). The doctoral candidate tried every means to keep participants motivated and engaged by sending personalized e-mails to participants asking if they needed help, such as opening a learning chapter or moving to the next chapter. The doctoral candidate also offered to schedule a phone call for participants if they had questions or were unable to continue with the learning program. Future research should attempt to use larger sample sizes to increase confidence in the results. The fourth major limitation of the study is the missing survey data at the third time of measurement. Due to performance issues of the gamified online training, a high number of participants did not continue the training and hence the data collection was

no longer pursued at T3. Future research might build on seeking for reasons behind performance issues in (gamified) online trainings and explore interventions with different length. Introducing multiple measurements over a longer period of time would likely provide additional information on the sustainability impact of the PsyCap intervention. What is missing in the gamified online training is the possibility for an automated recording and assessment of user behavior data such as the login frequency and the retention time of the learners in the individual training chapter (i.e., PsyCap learning content), which is a minor limitation. Such tools in the future could be utilized to record usage behavior over the long term and identify behavioral patterns. Another minor limitation was that the learning path in the gamified online training was not specified. This means that the participants could start and carry out the advanced level before the basic level. However, this was not particularly important, as the PsyCap elements were developed as a whole through the individual exercises in the three different levels (basic, intermediate, advanced). In addition, the levels did not necessarily build on each other thematically, so that strict adherence to the levels would have been necessary. Furthermore, the HERO training was not suitable for smartphones or tablets, which may be considered a limitation. This limitation may have made it difficult for participants to carry out the gamified online training while on the move without a laptop. However, it could be assumed that for the target group in the development organization, the laptop was the most important work tool and was therefore always with them. Accordingly, the gamified online training could also be carried out at any time. Another limitation of study 1 is the lack of group discussions. Luthans et al. (2010) underline that a crucial element of delivering the PCI are small guided group discussions to encourage the participants to share their individual goals and pathways with the group. This bi-directional group process of vicarious learning and modeling is meant to further enhance the level of self-efficacy of the participants and simultaneously strengthen their positive expectations (optimism) to achieve this goal. In the gamified online training, these guided group discussions were technically not possible.

3.4.3 Implications for further Research and Practice

The results described above hold important implications for both theory and practice. They address several practical implications not only for developing PsyCap as such, but also for human resource development. The application of POB is an relatively new research approach that has hardly been investigated in the context of combining PsyCap interventions with gamification elements. Further research in this area could address the question for which (work) groups of people such gamified online training interventions are most effective in ensuring the best fit between the individual and the intervention. Besides that, future research in the field of applied positive psychology in the work context might be directed towards addressing the conditions under which gamified online PsyCap interventions function in the workplace. Herewith, different lengths of training, forms of interface, and types of technology may be included to investigate a more detailed planning comparison (Luthans et al., 2008). Furthermore, it is highly important to examine the optimal level of implementing a PCI so that one does not become overly optimistic. In order to answer these questions, it is necessary to optimize the framework conditions under which gamified PsyCap interventions work in the corporate context, i.e., in ‘real-world settings’, particularly in high-tech corporations. The right setting plays a crucial part to

implement PsyCap development strategies successfully. “Unlike technical training, which focuses on developing specific skill sets and behavioral patterns, PsyCap development promotes positive thinking patterns that can challenge and replace deep-seated assumptions and beliefs over time” (Luthans & Youssef-Morgan, 2017, p. 17.19). Furthermore, a key factor for conducting gamified PsyCap online trainings is the virtual context. One of the most important advantages is the delivery of trainings across the globe simultaneously that make it accessible to the workforce. The gamified online platform and the learning contents were accessible 24/7 across different time zones and locations. The need for virtual trainings nowadays can be regarded as particularly high, especially in global settings where virtual teams and multinational setups are the norm. This study encourages future researchers and HR professionals to be creative and flexible when designing targeted and suitable (PsyCap) interventions for organizations and employees in terms of accessibility, costs, and settings. One suggestion is to combine PsyCap trainings with gamification techniques to expand beyond large high-tech corporations and to make them relevant for small and medium-sized enterprises (SME) in other industries. Besides that, future innovative PCI approaches should be made even more user-friendly and intuitive. These approaches should also match the training and development efforts in today’s modern workplaces, especially with regards to New Work approaches. Gamified online trainings are a relatively young concept that need to be continuously improved and developed both in terms of content and technology. Future studies in the field of PsyCap including the use of gamification elements should investigate to what extent the use of gamification has on the productivity of employees. In addition, advances in technology are making the presentation format in the training and work sector even more multifaceted and closer to reality, as demonstrated by machine learning (ML), artificial intelligence (AI), augmented reality (AR), and virtual reality (VR). Gamification formats benefit from these developments quite decisively, as they can use and exploit the new presentation formats. Future research projects should therefore combine innovative presentation formats such as AR and VR by adding PsyCap content into these modules. Furthermore, this and a lot of other studies were based on self-reporting measurements using the original 24-item PCQ or the shorter PCQ 12-item version to match the study objectives and the participants selected for the study. Future research should consider conducting more qualitative research to get a different perspective on the PsyCap construct and how it evolves in the workplace. Referring to the model of evaluation by Kirkpatrick (1979), it was not possible to collect objective company data to derive additional results from the PCI. Further research in this field should include performance data from employees to also track the fourth level of evaluation.

Additional examination of the discriminant and convergent validity of PsyCap with other apparently similar constructs, including core self-evaluations and positive affect is needed. Larger investigation is also desirable to assess test-retest reliability of PsyCap and within-person variability over time using longitudinal studies to confirm the state-like nature of PsyCap. Future research could investigate whether the PsyCap components are important for predicting other desirable workplace-related outcomes, including Organizational Citizenship Behavior (OCB) and psychological safety.

In conclusion, companies have started to actively promote positive psychology (PP) in general and positive organizational behavior (POB) in particular. It is of great advantage for organizations to integrate POB into their corporate structure and culture because its elements self-efficacy, hope, resilience, and optimism can be used to positively influence employees and their performance. To date, research on PsyCap has not undertaken an empirical investigation of combining PsyCap micro-interventions with gamification elements in an gamified online training. This study closes the gap and extends PsyCap research into new and innovative applications with gamification techniques. The *HERO of the Jungle* training is an innovative learning experience that succeeds in supporting employees to foster their non-technical skills (i.e., positive psychological resources) in a fun and engaging way by applying gamification techniques. This POB research showed that conducting a PCI in the workplace can be a useful tool to make employees aware of their PsyCap capabilities and enhance them. Additionally, the findings encourage executive, managers, and HR professionals to flexibly apply the PCI model to meet the needs of their employees and their organization. When setting up gamification trainings, however, it must be ensured that the technology works properly and that the gamification elements are understood by the participants and are intuitive. And it needs to be assured that the participants stick with the training until the end. The next chapter describes study 2 with the conducted classroom trainings to enhance PsyCap in the workplace.

Chapter 4 : Study 2 - Classroom Training *Personal Resource Development*

This chapter describes the second study of the classroom trainings *Personal Resource Development* within the development organization of the software corporation. It focuses on the face-to-face trainings to enhance PsyCap in the workplace. The reason for implementing the PsyCap classroom trainings was that the two methods, gamified online training and face-to-face training, could then be compared with one another in order to determine differences in the effectiveness of different PsyCap interventions (PCIs). First, a short introduction is outlined (see chapter 4.1). Second, the method including the classroom training structure and PsyCap development is explained (see chapter 4.2). Third, the results are described (see chapter 4.3) and finally discussed (see chapter 4.4).

4.1 Introduction

The higher-order positive construct of PsyCap is grounded in Positive Organizational Behavior (POB), namely "the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today's workplace" (Luthans, 2002a, p. 59). Herewith, organizational behavior deals with employee's positive characteristics such as strengths that can be developed. Citing earlier literature verifying the effectiveness of intervention measures for developing the four PsyCap elements (e.g. Bandura, 1997; Masten, 2001; Seligman, 1998; Snyder, 2000), Luthans, Avey et al. (2006) put forward their proposal for a brief "micro-intervention" namely the Psychological Capital Intervention (PCI). These 1 to 3 hours-workshops on the four psychological capacities (i.e., hope, self-efficacy, resilience, and optimism) were suggested as this would be needed to enlarge the results within a short time frame. In concordance with the authors, each of the PsyCap components can be developed by addressing specific tasks during the workshop. While there is sufficient evidence for the effectiveness of PsyCap online trainings (e.g., Luthans et al., 2008) on the one hand and PsyCap classroom trainings (e.g., Luthans et al., 2010; Luthans, Avey et al., 2006) on the other hand, valid empirical comparisons of such formats are rare. With regard to this thesis, it was destined to examine how the attendance in a face-to-face training would affect the PsyCap of individuals before, after, and two months after the course as opposed to the participants in CG 2 who did not receive a training. In addition, the aim is to compare the two PsyCap trainings comprehensively with one another. The following chapter illustrates the method of the classroom training *Personal Resource Development*.

4.2 Method

The classroom trainings were held in German and English at four locations across Germany. The workshops were announced through blog posts (potential reach of 14,877 members from the internal social network ending in 952 blog post views) and four e-mail distribution lists within the development organization of the company (same potential reach). One distribution list per location was used to inform the employees about the training offer via e-mail. The invitation text for the classroom training *Personal*

Resource Development is shown in Appendix I. The participants registered for the classroom training by accessing a dedicated webpage, which provided further information about the training content, dates, and location. Registered members received an e-mail reminder one week before the training containing the online survey (see Appendix B) with the request to complete it until the start of the workshop. The maximum number of seats for each workshop was limited to 20. The doctoral candidate was assisted by a colleague in preparing the nine training sessions. The next section provides the structure of the PsyCap classroom trainings.

4.2.1 Classroom Training Structure

The classroom trainings on PsyCap were announced as *Personal Resource Development* workshops at the investigated company to address the intention of the session and to promote the understanding of the study participants. In the following, the term *Personal Resource Development* (PRD) workshop always means the measure of the Psychological Capital Intervention (PCI), unless explicitly stated otherwise.

The study was conducted according to the following schedule:

- Week 1: After having successfully registered for the workshop via a registration link, the participants were invited by e-mail to complete the pre-survey (approx. 15 min) one week before the workshop (T1). They could complete the survey at any time during the week. On the second and fifth day, reminder e-mails were sent to the participants.
- Week 2: In the week following the pre-test, EG 2 participated in the four-hour PsyCap classroom training, which is described in more detail in the next chapter (see 4.2.2). Nine workshop sessions followed by the same agenda were delivered in total. On average, approximately 15 participants attended each workshop.
- Week 2-3: Directly after the workshop the participants were invited by mail to complete the post-survey (T2). They again had one week to complete the post-survey. As for the pre-test, on the second and fifth day, reminder e-mails were sent to the participants.
- Week 10-11: Eight weeks after participation in the workshop, the employees were invited to complete a follow-up survey (T3). They had again one week to complete it. As for the pre-test and post-test, on the second and fifth day, reminder e-mails were sent to the participants.

The survey data was collected by the internal survey management team from the software company. The raw data was sent to the doctoral candidate for analysis and evaluation at the end of the data collection phase. Only complete surveys from all three assessments were included in this study. At T1, 113 participants from EG 2 completed the online survey and at T2, 93 participants completed it. Finally, at T3, 83 participants filled out the survey and were included in the analyzes. T-test analysis showed that drop-outs from EG 2 (N = 20) did not differ significantly from the rest of the participants in the measured variables at T1. In addition, T-test analysis revealed that drop-outs from CG 2 (N = 19) did not differ significantly from the rest of the participants in the measured variables at T2 except for PsyCap.

The time required for the PsyCap face-to-face training is comparable to that of the gamified online training in study 1 (i.e., four hours).

4.2.2 Psychological Capital Development

The PsyCap intervention for the classroom training complied the PCI guidelines described in the trainer's guide for developing PsyCap by Luthans, Avolio, and Avey (2013). Respectively, it consisted of several theoretical and practical parts (see Appendix J for the handouts of the classroom training) as well as small group and group discussions. The learning content addressed the four elements of PsyCap for its enhancement. The PsyCap content of the two studies is comparable insofar as it addresses the development of the individual PsyCap elements hope, self-efficacy, resilience, and optimism in the exercises. At the beginning of the workshop, the doctoral candidate made a personal introduction, ensured that every participant had completed the online questionnaire, and explained the learning objectives of the workshop. The attendees would develop their positive psychological resources by

1) Precisely assessing adverse events at work
2) Developing strategies to use personal resources, and
3) Improving the ability to set work-related goals, identify multiple pathways, and detect potential obstacles.

The goal of the PsyCap workshop was that at the end of the workshop the participants would be able to better frame undesired events to react effectively and set, pursue, and achieve work-related goals. Additionally, the doctoral candidate assured that the discussed content was treated confidentially. This was done to establish transparency and credibility for the workshop members. The participants were informed about the concept of PsyCap, the definitions of its four components, and the need for its development. Three short video clips from the company's CEO (Chief Executive Officer) were shown on the topic to express the relevance of PsyCap and to gain commitment from the participants. These videos were not shown in the first study, because they were only published after the rollout of the gamified online training. The video clips addressed the following contents: 1) Goal orientation and paths, 2) overcoming obstacles as well as 3) self-assessment and self-affirmation. At the end of the workshop the participants were asked what they had taken away personally from the session. Below you find the sequence plan for the classroom training (see Figure 4-1). The chronological order of each exercise was taken from Luthans, Avolio, and Avey (2013). Therefore, the HERO order was not maintained for this study.

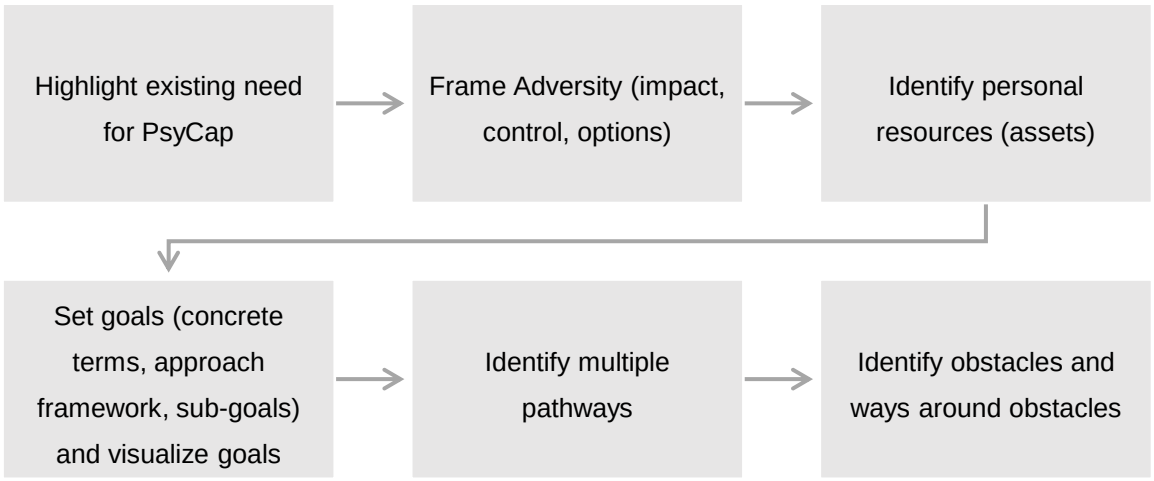


Figure 4-1. Sequence Plan of Classroom Training Personal Resource Development.

In the following, the content of the classroom training is described in more detail. An overview of the modules and their content can be found in Table 4-1.

Table 4-1

Psychological Capital Intervention (PCI) Model of Classroom Training according to Luthans, Avolio, and Avey (2013)

PsyCap element	Topic	Learn	Practice
Resilience	Adversity (35 min)	Teach participants realistic framing of adverse events	a) Describe last adverse situation and think about response
		Teach participants identifying real potential of risk and recognizing what outcomes they can control in reducing perceived risk (risk component of resilience)	b) Frame the issue in terms of impact, control and options
			c) Discussion: Talk with group members about the issue and record insights & discoveries
	Personal Resources (35 min)	Teach participants identifying personal resources that can be leveraged in responding to adversity (asset component of resilience)	a) Take adverse situation and think critically about applied resources
			b) Identify additional resources
			c) Discussion: Talk with group members about deployed resources and record insights & discoveries
Hope	Goal setting (15 min)	Teach participants choosing challenging and personally valuable goals	a) List few goals in current position and choose goal to work on
	Will-power (Motivation) (20 min)	Teach participants formulating goals in approach frameworks	a) Rephrase goal in terms of an approach framework incl. concrete endpoints
		Teach participants identifying sub-goals for main goal	b) Break goal into sub-goals
	Way-power (Pathways) (35 min)	Teach participants identifying multiple pathways, taking inventory of identified pathways, and visualizing pathways via diagramming goals	a) Diagram goal and make list (inventory) of major skills/resource needed in using the pathway
		Teach participants identifying obstacles and developing pathways to overcome them	b) List top three potential obstacles c) Think of ways around obstacles
Self-efficacy		Teach participants self-efficacy components	a) Master success, vicarious learning, social persuasion
Optimism		Teach participants advantages of self-talk	a) Activate internal attributions for success

For resilience, the doctoral candidate gave a short theoretical introduction into the topic. In terms of *adversity*, the purpose is building the ability to have a convincing view of reality. In particular, this consisted of making the individuals aware of how they frame certain issues at work and how they could change the way they frame issues. The first exercise covered identifying and describing a recent adverse work situation or event and thinking about the respective response. The next step was to frame the issue in terms of its impact, control, and possible options including talking with group members about the issues afterwards. This exercise is intended to challenge basic assumptions about how people view negative situations and to broaden their framing of the issue. It is about the risk component of resilience development. By discussing the issues with the group members, the participants could see additional ways for reacting to certain situations and events which would lead to an adjustment in their resources. Furthermore, the topic of personal resources was theoretically introduced to the workshop members. The next exercise was thinking back to the adverse event and remembering resources that they engaged in for that specific situation. The participants were also asked to think of additional resources that could have helped in the situation. Afterwards the participants talked about their situation in small groups including their applied resources. This exercise is designed to increase the individual's awareness of their assets. Therefore, by using more resources they expand their ability to favorably respond to negative events with competent functioning. Based on the theory, this exercise is addressing the assets component of resilience. In sum, the exercises were provided to boost the levels of resilience in the participants by gaining task mastery through 1) accurately framing adverse situations or events, 2) identifying personal resources to help overcoming setbacks (i.e., talents, skills, personal support networks), and 3) taking responsibility for risks within the goal's control.

The hope section of the workshop started with a learning exercise based on a goal setting exercise to increase the 'will-power' (motivation) dimension of hope. This was done by formulating a challenging and personally meaningful goal and setting concrete end points for the goal. The 'will-power' component of hope was addressed by both rephrasing the desired goal in terms of an approach framework (i.e., a goal that you are trying to achieve in contrast to moving away from a goal) including concrete endpoints and breaking the work-related goal into smaller sub-goals to attain it. The 'way-power' (pathways) component of hope was emphasized by visualizing the goal attainment through diagramming the goal and making a list (inventory) of major skills and resources that are needed in following the desired pathway. In addition, the employees were asked to list the top three potential obstacles on their way to their goal, as well as thinking of ways around the obstacles. In sum, the exercises were provided to raise the levels of hope in the participants by attaining task mastery in 1) setting goals that enhance 'will-power' through concrete end points, as well as challenging and personal valuable goals 2) visualizing goal accomplishment through diagramming, identifying multiple pathways, sub-goals, obstacles, and pathways around obstacles (i.e., 'way-power' component of hope).

For the self-efficacy portion of the workshop, a sense of their own self-efficacy was also addressed to achieve the work-related goals. For example, in developing self-efficacy, besides experiencing success through the goal-setting process, modeling and vicarious learning (i.e., listening to peers' plans) are also stimulated in the workshop. In the workshop, the participants experienced how others in the group had mastered success and, through social persuasion, received positive feedback about their success from

the group and the workshop facilitator. In sum, self-efficacy was reinforced through active mastery, modeling and vicarious learning, social persuasion and positive feedback in the PRD workshop.
For the optimism portion of the workshop, increasing an individual's positive expectation, the trainer taught the advantages of self-talk (Meichenbaum, 1975), to reframing negative thoughts and promote positive thoughts. Therefore, the PCI process not only builds hope in the individuals by finding the pathways to attain their desired goals, but also boosts their optimism. This is done by activating internal attributions for success and positively increasing their future expectations. To conclude, these PsyCap exercises had the proximal aim of enhancing participants' PsyCap to have a desirable impact on the attitudinal, behavioral and performance outcomes for the individual, team, and organization (Luthans, Avolio, & Avey, 2013). This chapter completes the method of the PsyCap classroom trainings and in the following, the results are explained.

4.3 Results

In this chapter, the results of study 2 are described to measure whether PsyCap as a core construct can be developed in the workplace through on-site classroom trainings (EG 2) based on the four components of self-efficacy, optimism, hope and resilience in contrast to CG 2. As in study 1, at the beginning the socio-demographic results (see 4.3.1) are reported followed by the descriptive results (see 4.3.2). Subsequently, the results regarding the examined hypotheses (see 4.3.3) and the post-training evaluation (see 4.3.4) are outlined. Ultimately, the results of the second study are summarized (see 4.3.5).

4.3.1 Socio-demographic Information

The following chapter describes the socio-demographic information of the participants from the PRD classroom trainings. For the analysis of the socio-demographic information, 83 participants from the experimental group 2 (EG 2), and 38 participants from the control group 2 (CG 2) who completed the online questionnaire at all three measurement points were included (see Table 2-1).
The first question contains the region in which the attendees worked (see Figure 4-2). The majority of the individuals from EG 2 (86%) and from CG 2 (63%) worked in Germany. The rest of the participants in both groups were split between EMEA (Europe, Middle East and Africa) North and South, Middle and Eastern Europe (MEE), and North America (NA). The rest of the regions are little represented as the workshops took place only in Germany whereas the CG 2 could have come from any region.

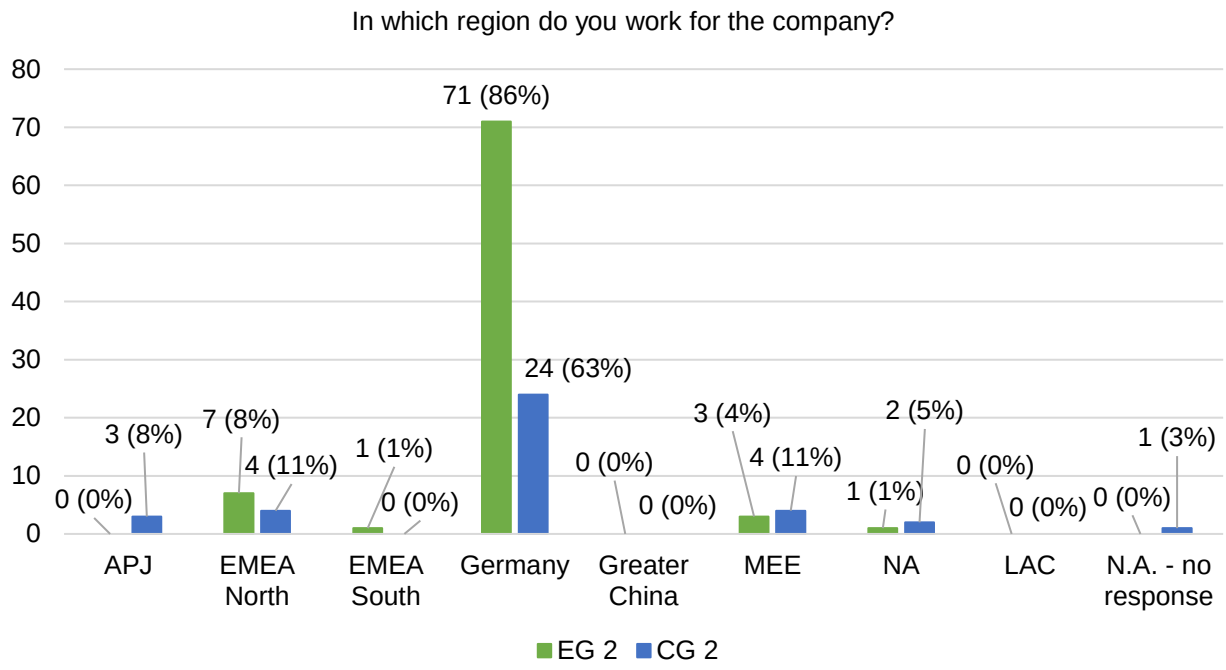


Figure 4-2. Socio-demographic Information EG 2 and CG 2: Region of Work.

The results of the gender distribution are shown in Figure 4-3. The analysis shows that more than half of the workshop participants were male (52%). Solely 7% of all participants did not answer the gender question in EG 2. With respect to CG 2, 68% of the participants were male and the rest are female.

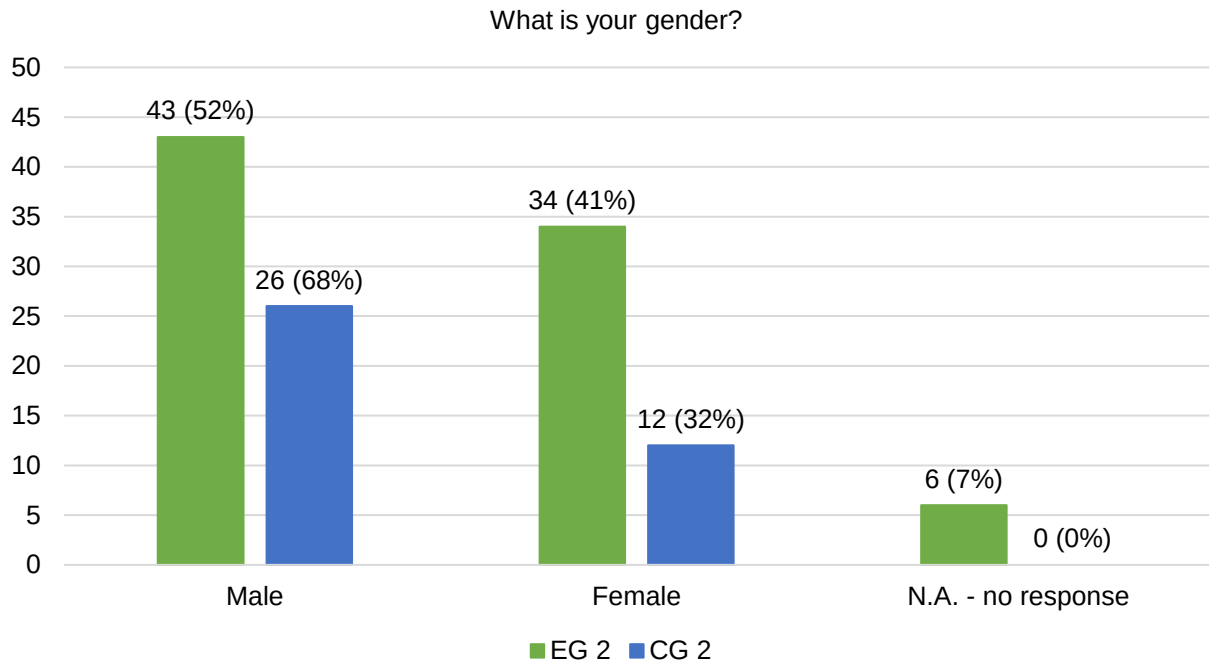


Figure 4-3. Socio-demographic Information EG 2 and CG 2: Gender.

The third demographic question addresses the age (see Figure 4-4). As a result, 17% of the participants in EG 2 and 26% of the participants in CG 2 were between 18 and 29 years old. The analysis shows that 22% of the workshop attendants and 11% of the participants in CG 2 were between 30 and 39 years old. Furthermore, 27% of the participants in EG 2 and 21% of the participants in CG 2 were between 40 and 49 years old as well as almost 30% of the individuals in EG 2 and 42% of the participants in CG 2 were between 50 and 59 years old.

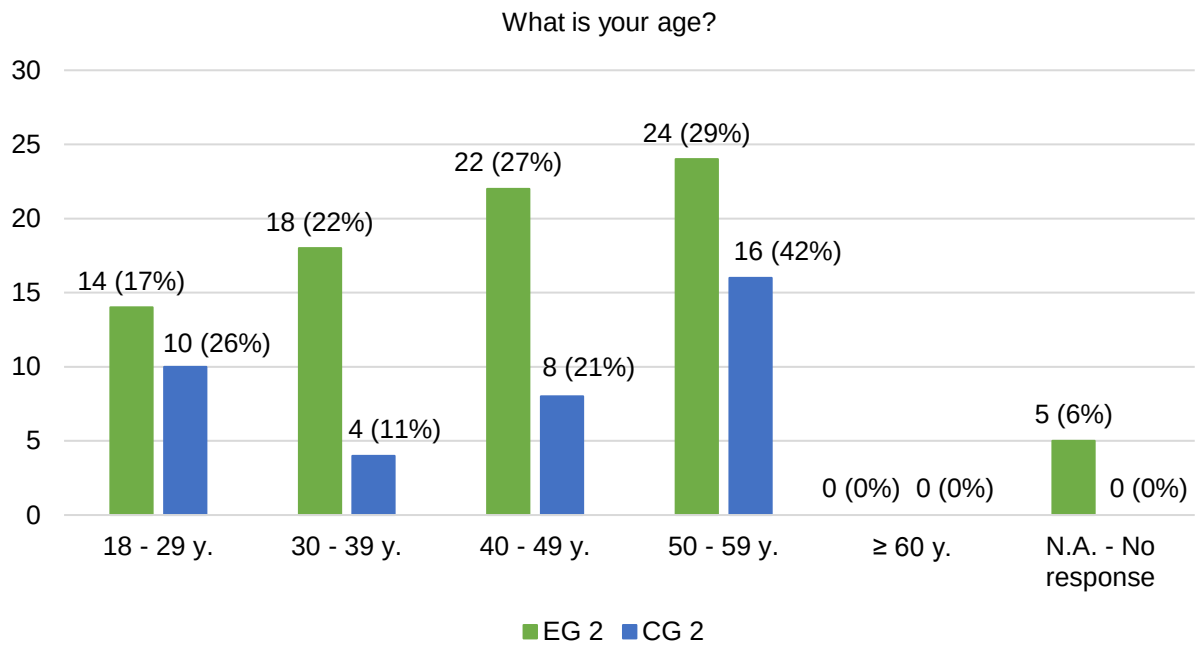


Figure 4-4. Socio-demographic information EG 2 and CG 2: Age.

The fourth socio-demographic question deals with the highest degree of the educational background (see Figure 4-5). The majority of the workshop members (70%) and 45% of the respondents in CG 2 held a Master's, Diploma or Magister degree. In addition, 17% of the attendees and 26% of the members of CG 2 held a Bachelor's degree. Moreover, 7% of the individuals in EG 2 and 18% of the individuals from CG 2 held a doctorate degree and 5% of the participants indicated 'Other' as education which, according to the free text comments, refers to having conducted an apprenticeship. Like in study 1, the groups were divided into two groups for the statistical analysis to better represent it. Accordingly, there is a group with a high level of education (master's and doctorate degree) and a group with an intermediate level of education (secondary school, high school, bachelor, and other).

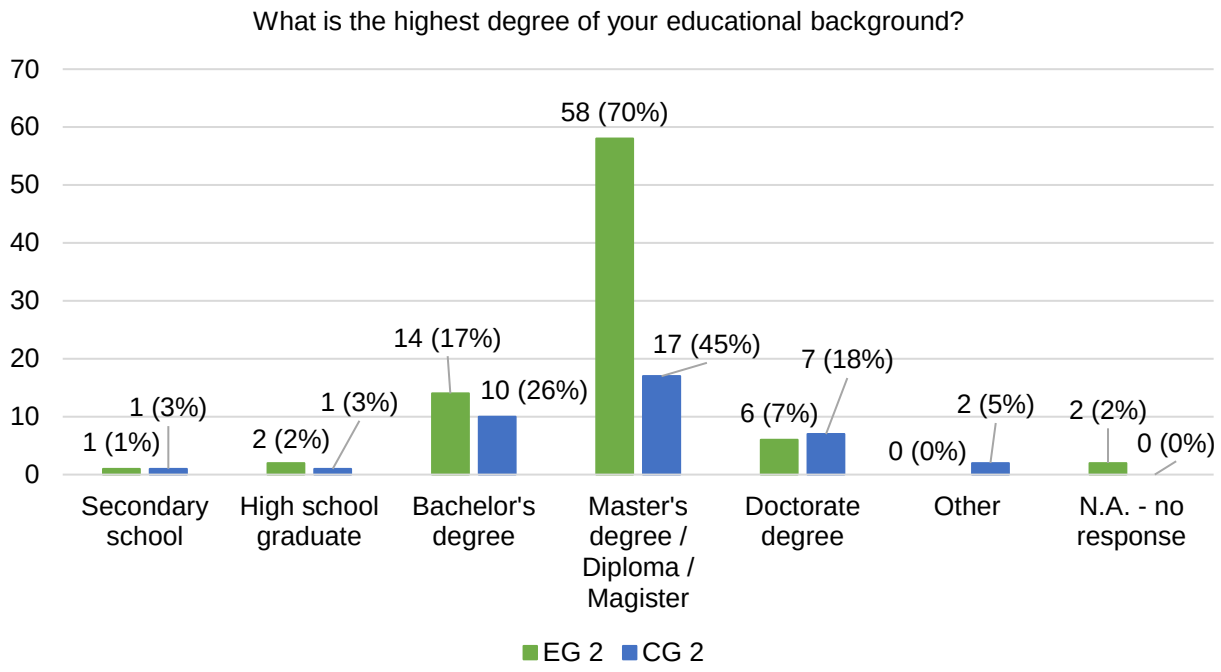


Figure 4-5. Socio-demographic Information EG 2 and CG 2: Education.

The fifth question pertains to the current employment status of the participants (see Figure 4-6)**.** The majority of all workshop attendees (72%) and 82% of the participants in CG 2 worked full-time at the company. Besides that, more than one fifth of the individuals in EG 2 and 8% of the individuals from CG 2 worked part-time. Only 6% of the participants in EG 2 did not indicate their employment status whereas 11% of the participants from CG 2 stated 'Other' in the response format meaning that they were employed as working students (as derived from the free text comments).

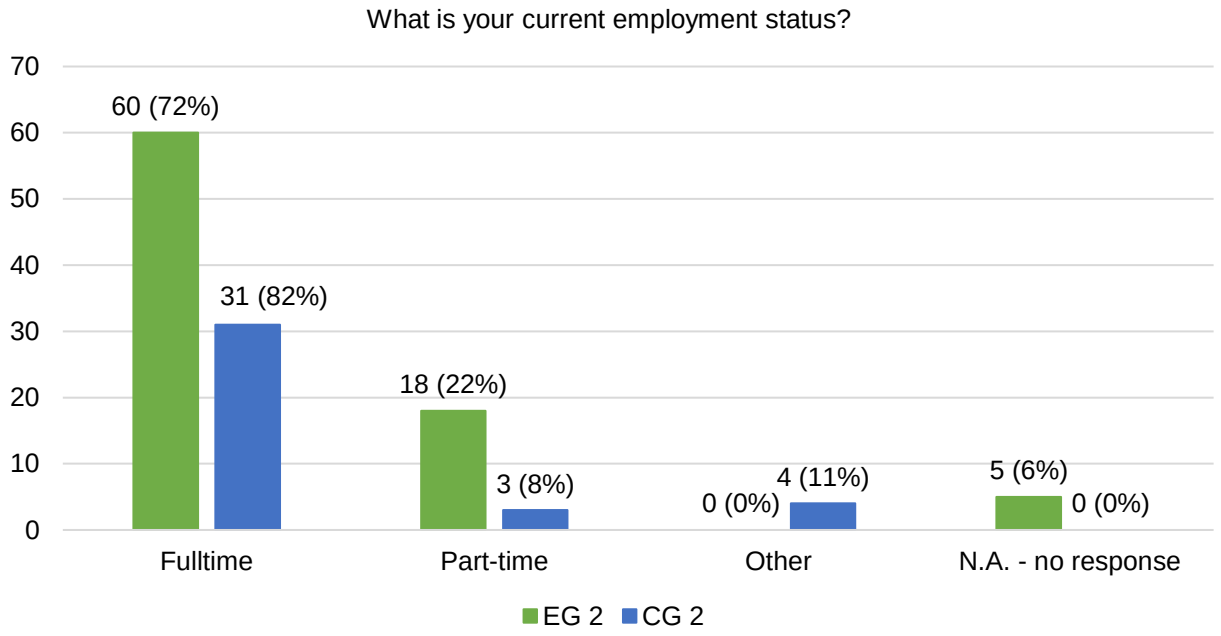


Figure 4-6. Socio-demographic information EG 2 and CG 2: Employment Status.

The last socio-demographic question (see Figure 4-7) contains the duration of employment at the investigated company. The majority of the workshop attendees (22%) and 11% from the individuals from CG 2 had been working between 16-20 years at the corporation. Almost one fifth of the individuals in EG 2 and even 29% of the participants in CG 2 had been working more than 21 years at the company. Besides that, the association with the organization in the group from 0 - 2 years made up 18% of the participants in EG 2 and 26% of the staff in CG 2, whereas 13% of all individuals in EG 2 and 16% of the individuals in CG 2 had been working between 6 and 10 years at the company. Furthermore, 12% of the workshop members had been working both between three and five years and between 11 and 15 years in the organization. Concerning CG 2, 8% of the members had been working between three and five years and 11% of the respondents had been working between 11 and 15 years in the software corporation. In summary, the samples show a very heterogeneous picture with regard to company affiliation.

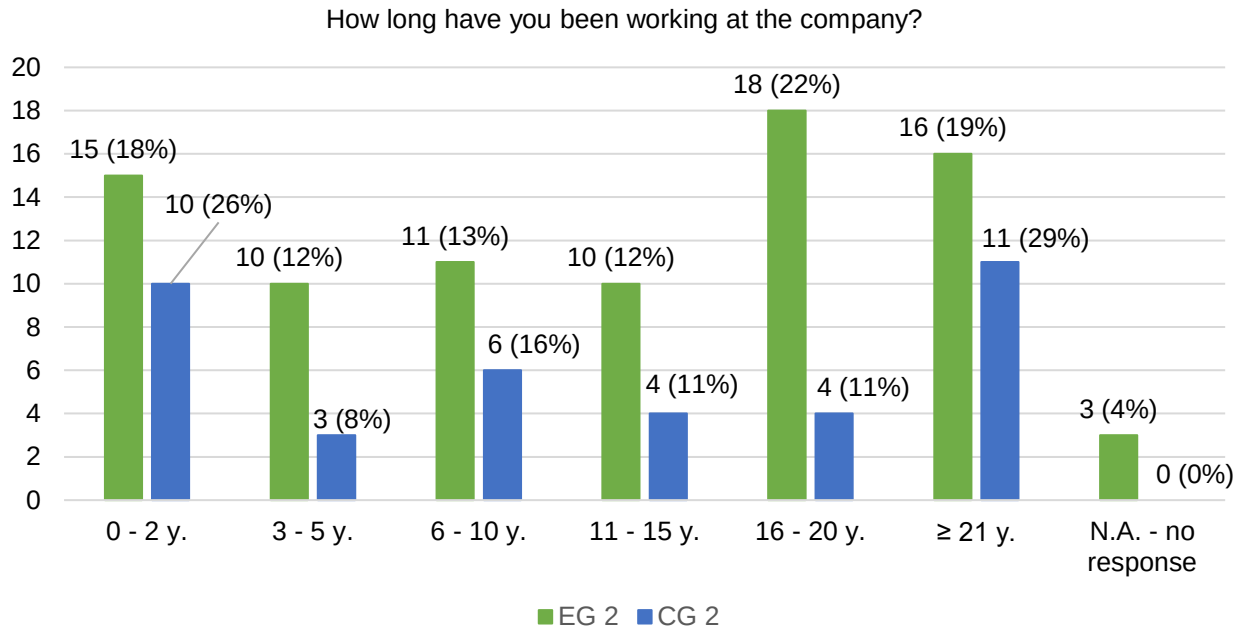


Figure 4-7. Socio-demographic Information EG 2 and CG 2: Company Affiliation.

Regarding the socio-demographic information in general, Chi-square test revealed that there are statistical differences between the two groups (EG 2 and CG 2) in terms of age ($\chi^2(5) = 35.68$, $p = .000$, $\varphi = 0.54$), education ($\chi^2(6) = 13.29$, $p = .039$, $\varphi = 0.33$), and work region ($\chi^2(5) = 21.66$, $p = .001$, $\varphi = 0.42$). According to Cohen (1988) the effect for age can be regarded a big effect, the effect for educational can be interpreted as medium effect, and the effect for work region can be regarded a medium to big effect. Overall, the socio-demographic information is consistent with the image of the workforce except for region. As the classroom trainings took place in Germany, this gives only a limited picture of the company, because the different regions are generally more strongly represented in the organization. In addition, the distribution of men (60%) and women (37%) in this study is close to the

gender distribution in the organization (male- female ratio: 70% to 30%). In the next chapter the descriptive statistics of study 2 are illustrated.

4.3.2 Descriptive Statistics

As already mentioned in chapter 2.1 (Study Samples and Research Design), 113 participants from EG 2 finished the online survey at T1, 93 participants completed it at T2, and finally, 83 participants answered all three questionnaires. The control group is comprised of people from a different organization within the company, however they also worked in development and had the most overlap with the development organization for job roles. At T1, 219 participants from the control group answered the online survey, at T2, 57 individuals completed it (i.e., CG 1), and lastly, at T3 38 participants finalized the questionnaire (i.e., CG 2). Only participants who had completed all three online surveys were included in the analysis. Consequently, the two groups were not equally distributed. Like in study 1, the mean values (*M*), standard deviations (*SD*), and internal consistencies (Cronbach's alpha) of the individual scales of the PCQ (including values for the overall PsyCap, work engagement, job satisfaction, and organizational commitment), are shown for EG 2 and CG 2 (see Table 4-2). An important point to consider is that the different scales in the questionnaire are scaled differently (PsyCap 1-6, WE 0-6, JS 1-5, OC 1-7). This concludes that on some scales it is easier to get higher mean values. Therefore, the comparability of the mean values is limited.

At T1 and T2, EG 2 shows the highest mean value in self-efficacy (M_{T1} = 4.25; SD_{T1} = .87; M_{T2} = 4.54; SD_{T2} = .77) for the PsyCap elements and the lowest mean value in optimism (M_{T1} = 4.03; SD_{T1} = .77; M_{T2} = 4.28; SD_{T2} = .80). At T3, the highest mean values of the PsyCap elements can be found in self-efficacy (*M* = 4.60; *SD* = .85) and resilience (*M* = 4.60; *SD* = .90). Again, the lowest mean value can be found in optimism (*M* = 4.30; *SD* = .86) at T3. Overall, the mean values for EG 2 for the PsyCap resources vary between *M* = 4.03 and *M* = 4.26 at T1, between *M* = 4.28 and *M* = 4.54 at T2, and between *M* = 4.30 and *M* = 4.60 at T3, indicating a right-hand distribution. The standard deviations of the single scales take on values between .66 and .92 for all three measurement points. Finally, there were similar high mean values in WE, JS, and OC as in PsyCap for EG 2. In sum, all scales in EG 2 indicate a positive trend in their mean values between T1, T2, and T3 as well as a right-hand distribution except for organizational commitment.

With regard to CG 2, the highest mean value of the PsyCap elements can be detected in self-efficacy at all measurement points (M_{T1} = 4.84; SD_{T1} = .71; M_{T2} = 4.93; SD_{T2} = .66; M_{T3} = 5.00; SD_{T3} = .64). Next, the lowest mean value of the PsyCap constructs can be found in optimism at all three test points (M_{T1} = 4.42; SD_{T1} = .70; M_{T2} = 4.44; SD_{T2} = .82 ; M_{T3} = 4.50; SD_{T3} = .73). Overall, the mean values for CG 2 for the PsyCap resources vary between *M* = 4.42 and *M* = 4.84 at T1, between *M* = 4.44 and *M* = 4.93 at T2, and between *M* = 4.50 and *M* = 5.00 at T3, indicating a right-hand distribution. Looking at the standard deviations of the different scales, they take on values between .64 and .91 for all three times of measurement. Lastly, the mean values in WE, JS, and OC were similar high as in PsyCap for CG 2. However, there were no positive trends in the work-related variables from T1 to T3. In sum, all PsyCap

scales indicate a positive trend in their mean values between T1 and T3 except for hope (M_{T1} = 4.72; SD_{T1} = .71; M_{T2} = 4.69; SD_{T2} = .74; M_{T3} = 4.70; SD_{T3} = .79).

Table 4-2

Descriptive Statistics of all Variables from EG 2 and CG 2 at all Measurement Points

	EG 2			CG 2		
	M	SD	α	M	SD	α
Self-efficacy_T_1	4.26	.87	.86	4.84	.71	.80
Self-efficacy_T_2	4.54	.77	.86	4.93	.66	.78
Self-efficacy_T_3	4.60	.85	.89	5.00	.64	.70
Hope_T_1	4.23	.86	.86	4.72	.71	.82
Hope_T_2	4.52	.88	.90	4.69	.74	.84
Hope_T_3	4.60	.90	.91	4.70	.79	.88
Resilience_T_1	4.22	.67	.75	4.62	.67	.64
Resilience_T_2	4.37	.71	.79	4.69	.57	.72
Resilience_T_3	4.50	.76	.80	4.73	.64	.78
Optimism_T_1	4.03	.77	.80	4.42	.70	.74
Optimism_T_2	4.28	.80	.84	4.44	.82	.80
Optimism_T_3	4.30	.86	.80	4.50	.73	.75
PsyCap_T_1	4.18	.66	.86	4.66	.53	.90
PsyCap_T_2	4.43	.70	.95	4.70	.57	.91
PsyCap_T_3	4.50	.74	.95	4.73	.60	.91
WE_T_1	3.50	.82	.88	3.95	.72	.85
WE_T_2	3.67	.90	.92	4.06	.73	.89
WE_T_3	3.78	.88	.91	4.05	.76	.88
JS_T_1	3.74	.95	.82	3.84	1.04	.88
JS_T_2	3.83	.77	.82	4.06	.88	.87
JS_T_3	3.86	.92	.90	3.88	.99	.90
OC_T_1	4.13	.78	.80	4.27	.86	.80
OC_T_2	4.13	.85	.85	4.06	.73	.85
OC_T_3	4.12	.92	.83	4.02	1.05	.86

Note. WE = Work engagement; JS = Job satisfaction; OC = Organizational commitment; EG 2:$_{T1\text{-}3:}$ N = 83; CG 2:$_{T1\text{-}3:}$ N = 38

As in study 1, the quality of the scales was analyzed by reliability analyzes. The overall PsyCap scale (i.e., 24 items) shows high internal consistencies with Cronbach's alpha values of .86 at T1 (and .90 for CG 2) as well as .95 at T2 and T3 for EG 2, and .91 at T2 and T3 for CG 2 (Bortz & Döring, 2016). All

in all, the reported reliability alphas are above the minimal acceptable level of .70 (Leary, 2008) except for resilience at T1 in CG 2 (α = .64). The results also apply to the subscales of PsyCap indicating reliability alphas above the minimal acceptable level of .70 (Bortz & Döring, 2016).
All other scales (i.e., work engagement, job satisfaction, and organizational commitment) for EG 2 and CG 2 were measured to have acceptable internal consistencies (α > .80) (Bortz & Döring, 2016). In the next chapter the results of the inferential statistics are illustrated to draw conclusions on the given hypotheses of study 2.

4.3.3 Inferential Statistics

In the following, the results of the inferential statistical analyzes from the classroom training (study 2) are reported and graphically embedded. As described in chapter 4.3.1, EG 2 contains 83 participants and CG 2 is comprised of 38 participants for all three measurement points that were included in the analysis. T-test analyzes for independent samples revealed that the mean values between EG 2 and CG 2 at T1 were significantly different for PsyCap ($t(119) = 3.80$, $p = .00$) and its components (i.e., hope ($t(119) = 3.07$, $p = .00$), self-efficacy ($t(119) = 3.51$, $p = .00$), resilience ($t(119) = 3.21$, $p = .00$), and optimism ($t(119) = 2.70$, $p = .00$)). This means that the two groups already differed significantly in their mean values for PsyCap and its elements at T1. Accordingly, CG 2 had significantly higher mean values in PsyCap and its elements). The next section presents the results of the inferential statistical analyzes to answer the hypotheses.

Hypothesis 5:
EG 2 will show a significant increase in their PsyCap at T2 and T3 compared to CG 2.

The ANCOVA with repeated measures to test hypothesis 5 (see Table 4-3), showed no significant main effects nor interaction effects.

Table 4-3
Statistical Analysis of PsyCap in EG 2 and CG 2

Source	F-value	df1	df2	Sig.	Partial Eta squared
PsyCap	.351	1	119	.555	.003
Group	.003	1	119	.953	.000
PsyCap * Group	.152	1	119	.697	.001
PsyCap * Age	.579	1	119	.448	.005
PsyCap * Group * Age	.846	1	119	.360	.008
PsyCap * Gender	1.704	1	119	.195	.016
PsyCap * Group * Gender	.065	1	119	.799	.001
PsyCap * Education	.388	1	119	.534	.004
PsyCap * Group * Education	.938	1	119	.335	.009

The course of PsyCap from EG 2 and CG 2 from T1 to T3 is shown in Figure 4-8. It can be observed that the values in CG 2 are slightly higher than the values in EG 2. Furthermore, the values in CG 2 tend to increase slightly over time (M_{T1} = 4.65; M_{T2} = 4.69; M_{T3} = 4.73). EG 2 shows a stronger increase in PsyCap (M_{T1} = 4.20; M_{T2} = 4.43; M_{T3} = 4.50) in comparison to CG 2 over time. However, this difference is not significant. Hypothesis 5 must therefore be rejected.

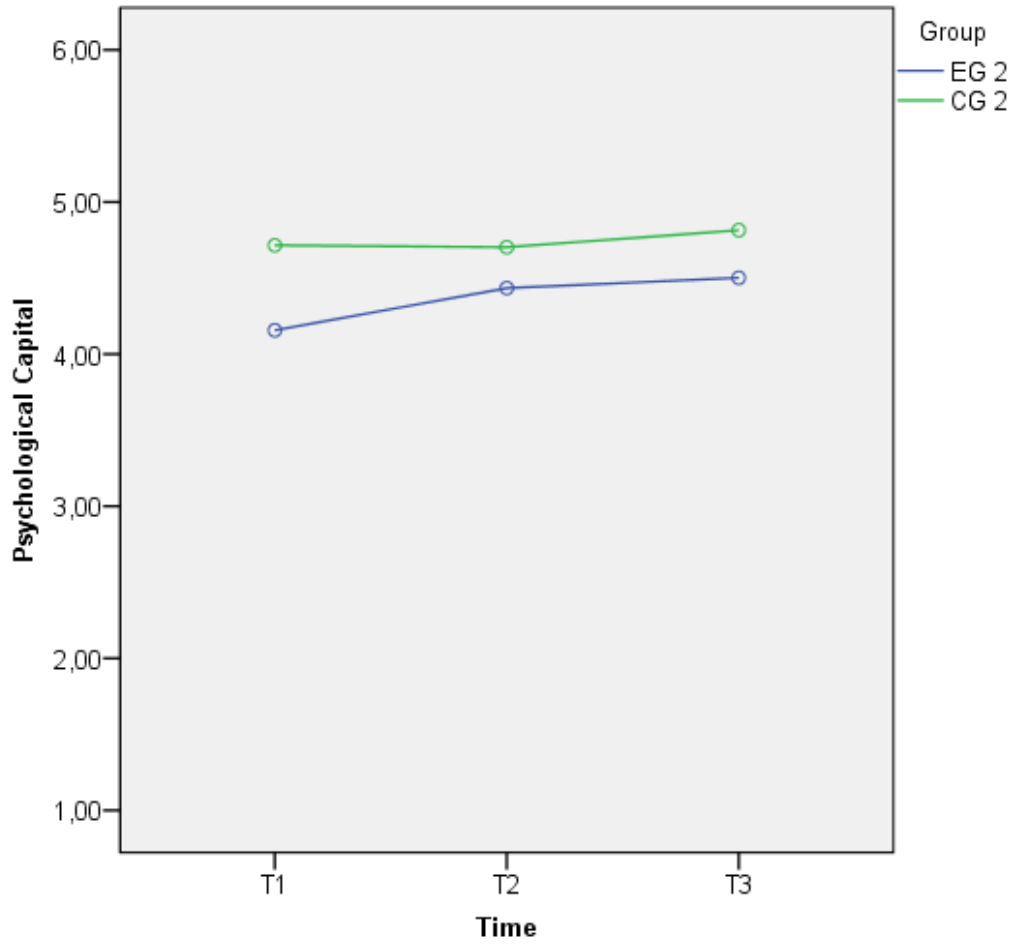


Figure 4-8. Course in PsyCap for EG 2 and CG 2.

Hypothesis 5a:
EG 2 will show a significant increase in their hope at T2 and T3 compared to CG 2.

The ANCOVA with repeated measures to test hypothesis 5a revealed no significant main or interaction effects (see Table 4-4).

Table 4-4

Statistical Analysis of Hope in EG 2 and CG 2

Source	F-value	df1	df2	Sig.	Partial Eta squared
Hope	.515	1	119	.474	.005
Group	.139	1	119	.710	.001
Hope * Group	.125	1	119	.724	.001
Hope * Age	2.854	1	119	.094	.026
Hope * Group * Age	2.726	1	119	.102	.025
Hope * Gender	2.794	1	119	.098	.025
Hope * Group * Gender	.902	1	119	.344	.008
Hope * Education	.013	1	119	.910	.000
Hope * Group * Education	.009	1	119	.927	.000

Figure 4-9 illustrates the course in hope for EG2 and CG 2 at all three measurement points. It is noteworthy that the values in CG 2 slightly increase over time (M_{T1} = 4.72; M_{T2} = 4.69; M_{T3} = 4.70). On the contrary, the values in EG 2 increase stronger over time (M_{T1} = 4.23; M_{T2} = 4.52; M_{T3} = 4.60). Nevertheless, this difference is not significant and hypothesis 5a must therefore be rejected.

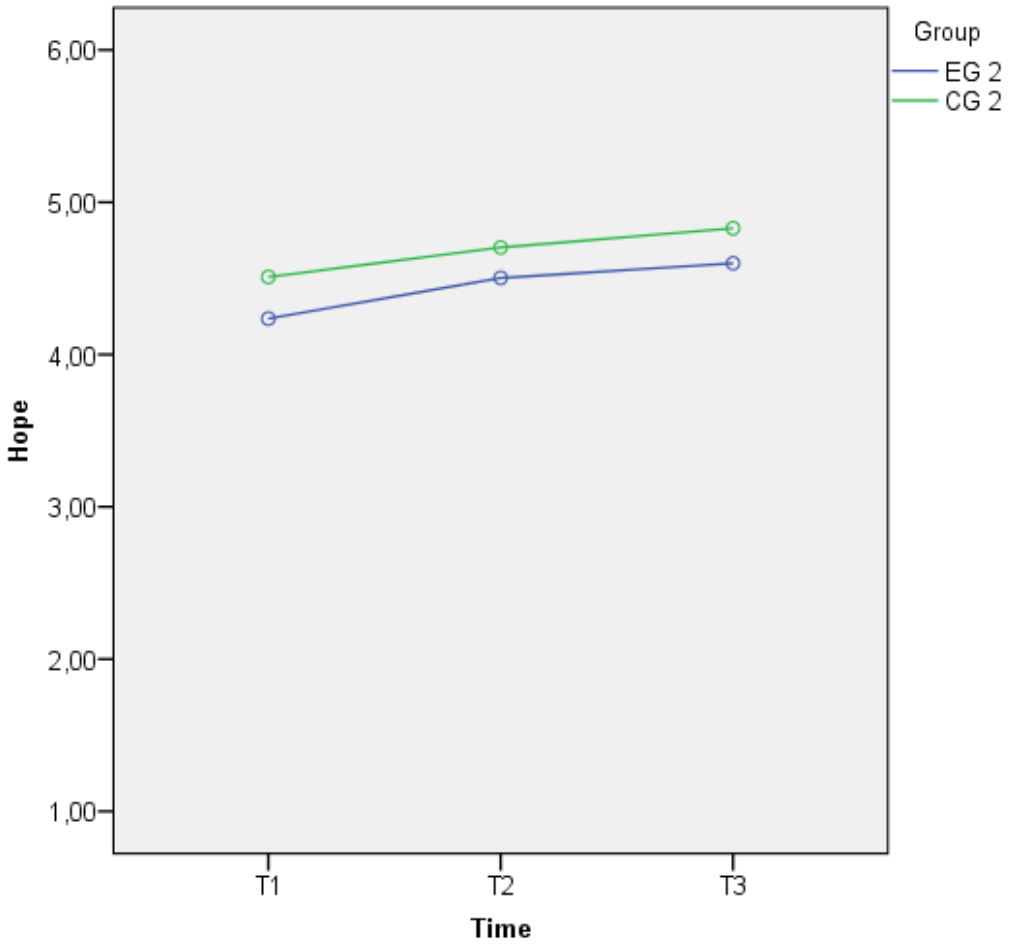


Figure 4-9. Course in Hope for EG 2 and CG 2.

Hypothesis 5b:
EG 2 will show a significant increase in their self-efficacy at T2 and T3 compared to CG 2.

The ANCOVA with repeated measures to test hypothesis showed no significant main effects nor any interaction effects (see Table 4-5).

Table 4-5
Statistical Analysis of Self-efficacy in EG 2 and CG 2

Source	F-value	df1	df2	Sig.	Partial Eta squared
Self-efficacy	.708	1	119	.402	.007
Group	.135	1	119	.713	.001
Self-efficacy * Group	.001	1	119	.977	.009
Self-efficacy * Age	2.574	1	119	.112	.023
Self-efficacy * Group * Age	1.876	1	119	.458	.005
Self-efficacy * Gender	.556	1	119	.458	.005
Self-efficacy * Group * Gender	.1119	1	119	.731	.001
Self-efficacy * Education	.000	1	119	.986	.000
Self-efficacy * Group * Education	.808	1	119	.371	.007

The course of self-efficacy from the experimental group 2 and CG 2 at the three measurement points is shown in Figure 4-10. Like for PsyCap and hope, the values in self-efficacy from CG 2 are higher than the values in EG 2. The values in self-efficacy from CG 2 slightly increase over time (M_{T1} = 4.84; M_{T2} = 4.93; M_{T3} = 5.00). In addition, the values in self-efficacy from EG 2 tend to increase stronger from T1 to T3 compared to CG 2 (M_{T1} = 4.26; M_{T2} = 4.54; M_{T3} = 4.60). However, this difference is not significant. Hence, hypothesis 5b must be rejected.

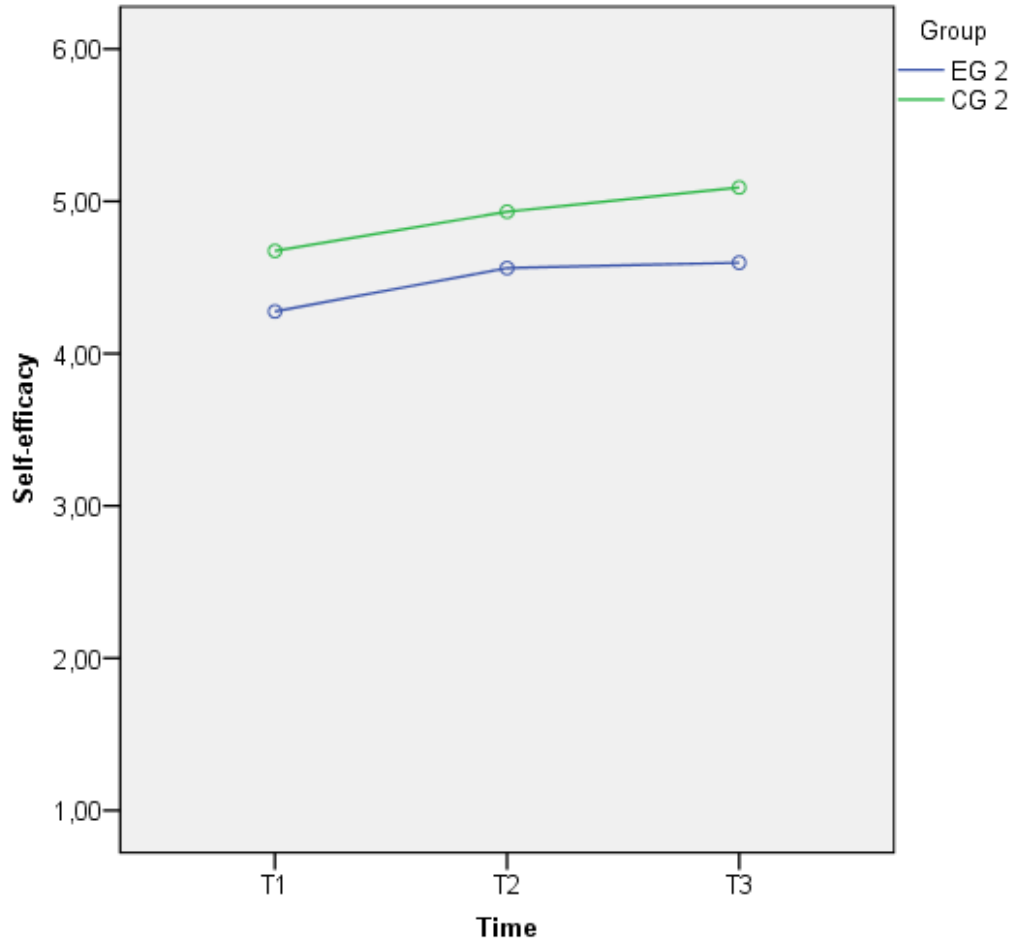


Figure 4-10. Course in Self-efficacy for EG 2 and CG 2.

Hypothesis 5c: EG 2 will show a significant increase in their resilience at T2 and T3 compared to CG 2.

In the resilience scale (see Table 4-6) there are no main effects nor interaction effects. Hypothesis 5c must therefore be rejected.

Table 4-6

Statistical Analysis of Resilience in EG 2 and CG 2

Source	F-value	df1	df2	Sig.	Partial Eta squared
Resilience	.335	1	119	.564	.003
Group	.535	1	119	.466	.005
Resilience * Group	.000	1	119	.983	.000
Resilience * Age	.526	1	119	.4700	.005
Resilience * Group * Age	1.541	1	119	.217	.014
Resilience * Gender	.169	1	119	.682	.002
Resilience * Group * Gender	.478	1	119	.491	.004
Resilience * Education	.030	1	119	.863	.000
Resilience * Group * Education	.006	1	119	.938	.000

Figure 4-11 shows the course of resilience graphically. It can be observed that the values in CG 2 tend to increase slightly over time (M_{T1} = 4.62; M_{T2} = 4.69; M_{T3} = 4.73). Moreover, EG 2 shows a stronger increase in resilience (M_{T1} = 4.22; M_{T2} = 4.37; M_{T3} = 4.50) in comparison to CG 2 over time.

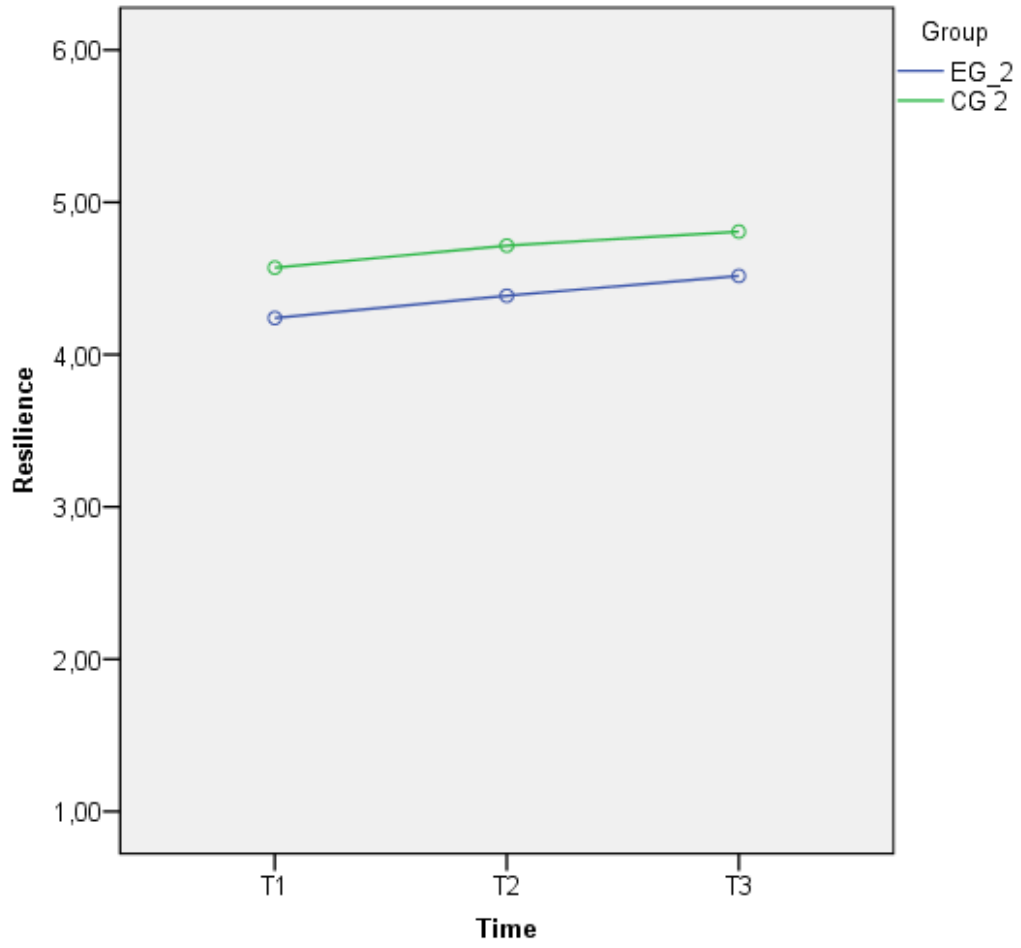


Figure 4-11. Course in Resilience for EG 2 and CG 2.

Hypothesis 5d:
EG 2 will show a significant increase in their optimism at T2 and T3 compared to CG 2.

The ANCOVA with repeated measures to test hypothesis 5d revealed no significant main effects nor any interaction effects (see Table 4-7).

Table 4-7
Statistical Analysis of Optimism in EG 2 and CG 2

Source	F-value	df1	df2	Sig.	Partial Eta squared
Optimism	.194	1	119	.661	.002
Group	.065	1	119	.800	.001
Optimism * Group	.089	1	119	.766	.001
Optimism * Age	3.135	1	119	.079	.028
Optimism * Group * Age	1.744	1	119	.190	.016
Optimism * Gender	.162	1	119	.688	.002
Optimism * Group * Gender	.003	1	119	.957	.000
Optimism * Education	.095	1	119	.759	.001
Optimism * Group * Education	.312	1	119	.577	.003

The following graph (see Figure 4-12) illustrates the course in optimism for EG 2 and CG 2 at the three measurement points. It can be noticed that the values in CG 2 tend to increase slightly over time (M_{T1} = 4.42; M_{T2} = 4.44; M_{T3} = 4.50) whereas EG 2 first shows a stronger increase in self-efficacy (M_{T1} = 4.03; M_{T2} = 4.28; M_{T3} = 4.30). Nevertheless, this difference is not significant. Hence, hypothesis 5d must be rejected.

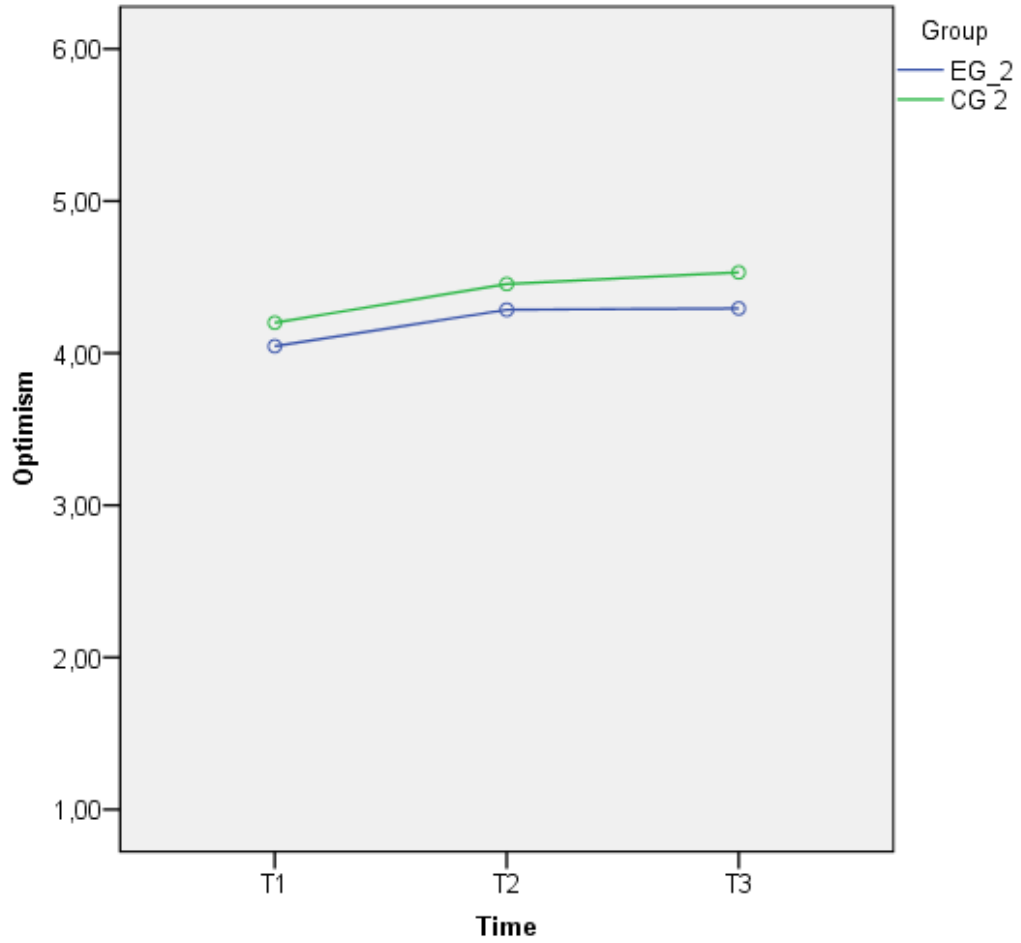


Figure 4-12. Course in Optimism for EG 2 and CG 2.

To summarize, the statistical analysis of hypothesis 5 revealed neither significant main effects nor interaction effects in PsyCap between EG 2 and CG 2. Hypothesis 5 must therefore be rejected. Concerning the four PsyCap components (hypotheses 5a-5d), the interaction effects did not show significant difference on the hope, self-efficacy, resilience and optimism scale for EG 2 and CG 2. As a result, hypotheses 5a – 5d need to be rejected. These results reflect the results from study 1. Since PsyCap is strongly associated with desired employee attitudes, behaviors, and performance such as job satisfaction, job engagement, and organizational commitment (Avey et al., 2011), these hypotheses are presented next.

Hypothesis 6:
The employees' level of PsyCap from EG 2 and CG 2 will be positively related to their job satisfaction (JS) at T1, T2, and T3.

As shown in Table 4-8, there is a statistically significant positive correlation between PsyCap and job satisfaction at T1 ($r = .57$, $p < .01$). According to Zöfel (2003) this can be seen as a medium correlation. A statistically significant positive correlation between PsyCap and JS can be also reported at T2 ($r = .66$, $p < .01$). According to Zöfel (2003), this can be regarded a medium correlation as well. At T3, Table 4-8 shows a statistically significant positive correlation between PsyCap and job satisfaction ($r = .62$, $p < .01$). According to Zöfel (2003), the correlation can be considered a medium correlation. Hypothesis 6 can therefore be accepted. It should be mentioned that the correlations do not change significantly when both groups, EG 2 and CG 2, are separated. Accordingly, this applies to hypotheses 7 and 8 as well.

Hypothesis 7:
The employees' level of PsyCap from EG 2 and CG 2 will be positively related to their engagement at work (WE) at T1, T2, and T3.

At T1, Table 4-8 shows a statistically significant positive correlation between PsyCap and work engagement ($r = .70$, $p < .01$). A statistically significant positive correlation between PsyCap and WE can also be reported at T2 ($r = .77$, $p < .01$). These can be considered both high correlations (Zöfel, 2003). Finally, Table 4-8 shows a statistically significant positive correlation between PsyCap and WE at the last time of testing as well ($r = .81$, $p < .01$), which can be regarded as a high correlation. Hypothesis 7 can therefore be accepted.

Hypothesis 8:
The employees' level of PsyCap from EG 2 and CG 2 will be positively related to their organizational commitment at T1, T2, and T3.

As illustrated in Table 4-8, there is no statistically significant correlation between PsyCap and organizational commitment at T1. This is also true for the correlation of PsyCap and OC at T2 and T3. Hypothesis 8 must therefore be rejected. When the organizational commitment scale, however, is divided into the three subscales (affective, continuance, and normative commitment scale), there is a significant positive correlation between PsyCap and the affective commitment scale (ACS) at T1 ($r = .31$, $p < .01$), T2 ($r = .42$, $p < .01$), and T3 ($r = .44$, $p < .01$) (see Appendix M.2). These correlations can be regarded as low correlations (Zöfel, 2003). Moreover, significant negative correlations can be detected between PsyCap and the continuance commitment scale at T1 ($r = -.35$, $p < .01$), T2 ($r = -.30$, $p < .01$) and at T3 ($r = -.31$, $p < .01$). According to Zöfel (2003) these correlations can be interpreted as low correlations. Finally, there are no significant positive correlations between PsyCap and the normative commitment scale at the three measurement points.

Table 4-8

Correlation of Dependent and Independent Variables from Classroom Training at T1, T2, and T3

	1	2	3	4	5	6	7	8	9	10	11	12
1. PsyCap_T1	—											
2. JobSatisfaction_T1	.569**	—										
3. WorkEngagement_T1	.697**	,652**	—									
4. OrgCommitment_T1	.047	.334**	.254**	—								
5. PsyCap_T2	.027	-.040	.117	-.047	—							
6. JobSatisfaction_T2	.094	.203*	.159*	.015	.661**	—						
7. WorkEngagement_T2	.115	.107	.206*	.003	.771**	.734**	—					
8. OrgCommitment_T2	-.010	.033	.072	.083	.111	.436**	.369**	—				
9. PsyCap_T3	.112	.087	.220**	-.022	.669**	.415**	.553**	-.001	—			
10. JobSatisfaction_T3	.104	.270**	.222**	.062	.382**	.504**	.410**	.104	.622**	—		
11. WorkEngagement_T3	.118	.152*	.248**	.061	.554**	.481**	.626**	.163*	.813**	.725**	—	
12. OrgCommitment_T3	.030	.117	.190*	.121	-.007	.102	.134	.326**	.124	.426**	.298**	—

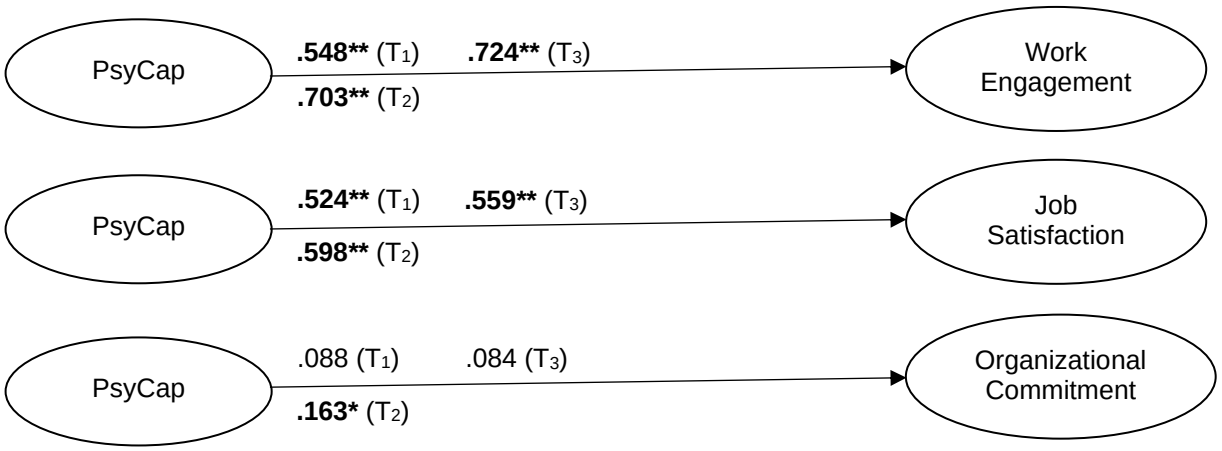
Note: **. Correlation is significant at level 0.01 (one-sided); *. Correlation is significant at level 0.05 (one-sided); *N* = 121

Further Analyzes: Influence of PsyCap on work-related Variables in the Classroom Trainings

To discuss whether PsyCap and its components explain variance in relevant work-related constructs in the classroom training, multiple regression analyzes were conducted for the same variables as in study 1 (see Appendix N.2 for detailed information). Hence, the four PsyCap elements (independent variables; measured as total score) as well as the respective workplace components (dependent variables) were encompassed in the model (see Figure 4-13). In a next step, the PsyCap dimensions were examined in more detail to find out what influence they have on the work-related variables.

Consequently, 54.8% (R^2 = .548) of the variance in work engagement was explained by PsyCap at T1 with optimism as a significant predictor of WE (β = .517, p< .05). At the second measurement point, 70.3% (R^2 = .703) of the variance in WE was explained by PsyCap with hope (β = .487, p< .05), resilience (β = .256, p< .05), and optimism (β = .232, p< .05) as significant predictors for WE. For T3, 72.4% (R^2 = .724) of the variance in WE was explained by PsyCap. Thereby, hope (β = .548, p< .05) was a significant predictor for WE.

According to the regression analysis, 52.4% (R^2 = .524) of the variance in job satisfaction was explained by PsyCap at T1. In this regard, just like in study 1, optimism was a significant predictor for job satisfaction (β = .480, p = .05). For T2, 59.8% (R^2 = .598) of the variance in JS was explicated by PsyCap. In that respect, hope (β = .425, p = .05) and optimism (β = .381, p = .05) are significant predictors for JS just like in study 1. Regarding T3, 55.9% (R^2 = .559) of the variance in JS was explained by PsyCap with hope (β = .481, p = .05) and optimism (β = .371, p = .05) as significant predictors for JS as well. Finally, no significant result for PsyCap explaining variance in organizational commitment was calculated at T1. Concerning T2, 16.3% (R^2 = .163) of the variance in OC was explained by PsyCap indicating self-efficacy (β = - .520, p < .05) as a significant predictor. At T3, no significant effect for PsyCap explaining variance in OC was detected. Overall, according to Cohen (1988), the results show a strong variance explanation of work engagement and job satisfaction by PsyCap at all measurement points and a medium variance explanation of organizational commitment by PsyCap at T2.



Note. * = p < .05; ** = p < .01

Figure 4-13. PsyCap Model Overview with relevant work-related Variables for EG 2 at T1, T2, T3.

In conclusion, the results from the hypotheses 6 and 7 show significant positive correlations between PsyCap and job satisfaction as well as between PsyCap and work engagement at all measurement points (i.e., T1, T2, and T3). These can be interpreted as medium correlations between PsyCap and JS and as high correlations between PsyCap and WE. Finally, there are no statistically significant correlations between PsyCap and organizational commitment at all three measurement points. Concerning the multiple regression analysis, 52% of the variance in JS is explained by PsyCap at T1, 60% at T2, and 56% at T3. Moreover, 55% of the variance in WE is explained by PsyCap at T1, 70% at T2, and 72% at T3. Ultimately, 16% of the variance in OC is explained by PsyCap at T2. Other than that, no significant results for PsyCap to explain variance in OC were calculated. In sum, according to Cohen (1988), the results show a strong variance explanation of work engagement and job satisfaction by PsyCap at all measurement points and a medium variance explanation of organizational commitment by PsyCap at T2. The next chapter describes the results of the post-training evaluation of the PRD classroom trainings.

4.3.4 Post-Training Evaluation

The following chapter describes the evaluation of the nine PsyCap classroom trainings. The participants of EG 2 had the opportunity to provide feedback on the PsyCap intervention measure at T2 and T3. The assessment was divided up into six closed questions at T2 (directly after the classroom training) that had to be answered by the participants, and four open questions that could have been answered voluntarily by them at T2 (see Appendix B, Evaluation). In addition, the participants were asked two closed questions at T3 (follow-up). It is worth mentioning that the question about the format and the design from the gamified learning was no longer asked due to the missing fit of the workshop style. Instead, two questions about the trainer (i.e., the doctoral candidate) were queried. The first five questions of the closed questions correspond to the first level of evaluation (i.e., reaction of the participants including their thoughts about the classroom training) in concordance with Kirkpatrick (1979). Questions were asked about the recommendation of the classroom training, course activities, content relevance, and facilitator knowledge. Concerning the first two open questions, the participants were asked what they liked most in the PRD workshop and what suggestions for improvement they had. These questions also addressed the ‘reaction’ component from Kirkpatrick (1979). An overview of the questions asked for the post-training evaluation can be found in Table 2-4.

As can be seen in Figure 4-14, 43% of the training members agreed to recommend the classroom training to a friend or colleague and a little bit more than one fifth (22%) of the attendants strongly agreed to recommend it. Moreover, 27% of the participants somewhat agree in recommending the face-to-face training. Solely a small percentage of the participants would not recommend the classroom training to a friend or colleague. To summarize, 65% of the participants would recommend the PRD classroom training to a friend or colleague and 27% would rather recommend it.

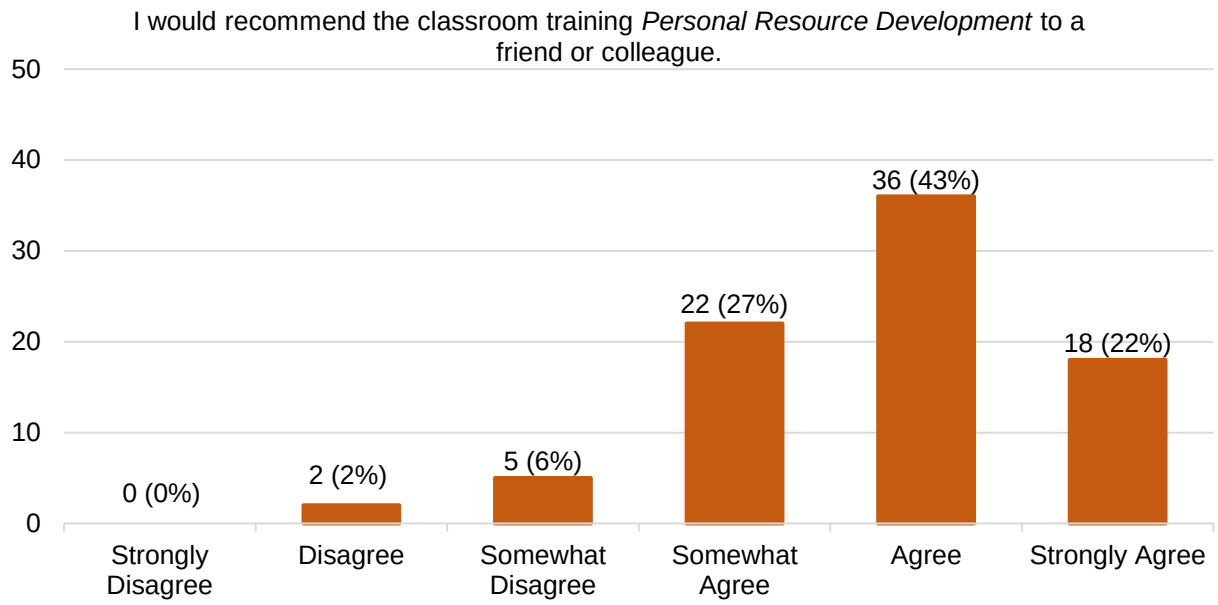


Figure 4-14. Recommendation of Classroom Training.

Figure 4-15 demonstrates the results of the second closed question of the evaluation questionnaire. Thus, almost half of the participants agreed that theoretical and practical learning content was balanced. Furthermore, one fifth of the attendees strongly agreed with the statement and almost one fifth of the workshop attendees somewhat agreed that the theory and practical exercises were balanced. One tenth of the participants somewhat disagreed with a good balance between theory and practice and only a small percentage of the participants found that there was not a good balance between theory and practice. In sum, 67% of the participants declared that theoretical and practical learning parts were balanced and 19% of the participants found the learning activities rather balanced.

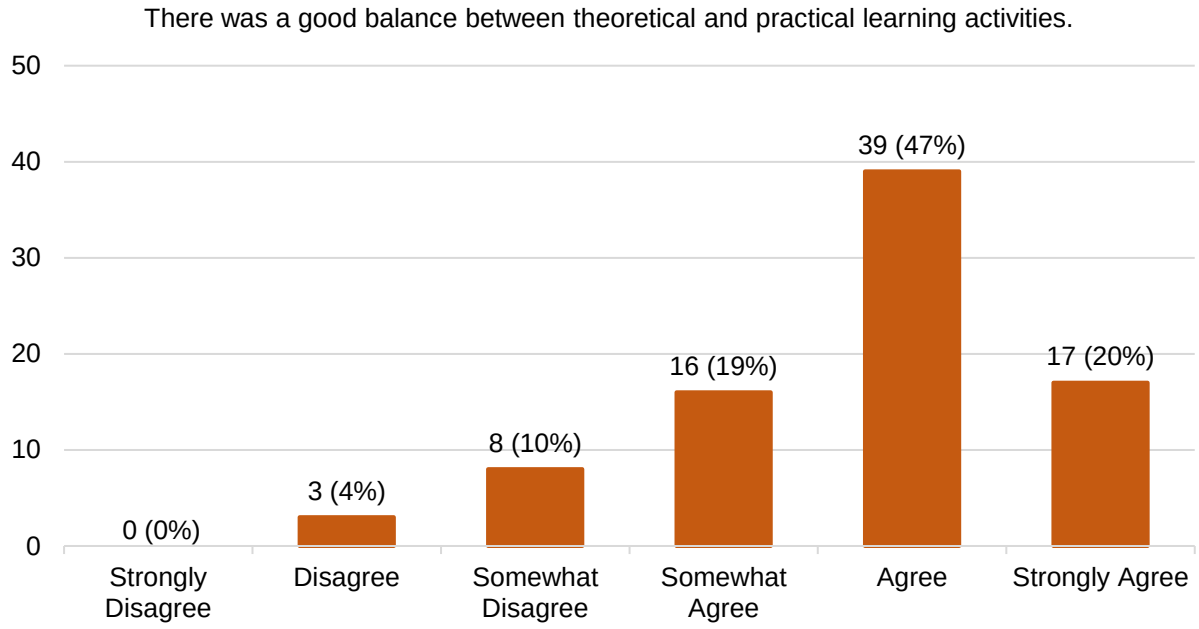


Figure 4-15. Balance of Classroom Training Activities.

Referring to the third closed evaluation question (see Figure 4-16), almost 30% of the participants somewhat agreed and even 40% of the attendees agreed that the presentation and exercises were well suited to convey the content. One fourth of the individuals strongly agreed with the statement and only one tenth of the individuals somewhat disagree that the presentation and practical tasks were well suited to convey the content of the workshop. Only a very small percentage of the participants was not in line with the suitability of the classroom training content. Overall, 60% of the workshop members found the presentation and exercises well suited to convey the content and 28% found them rather well suited.

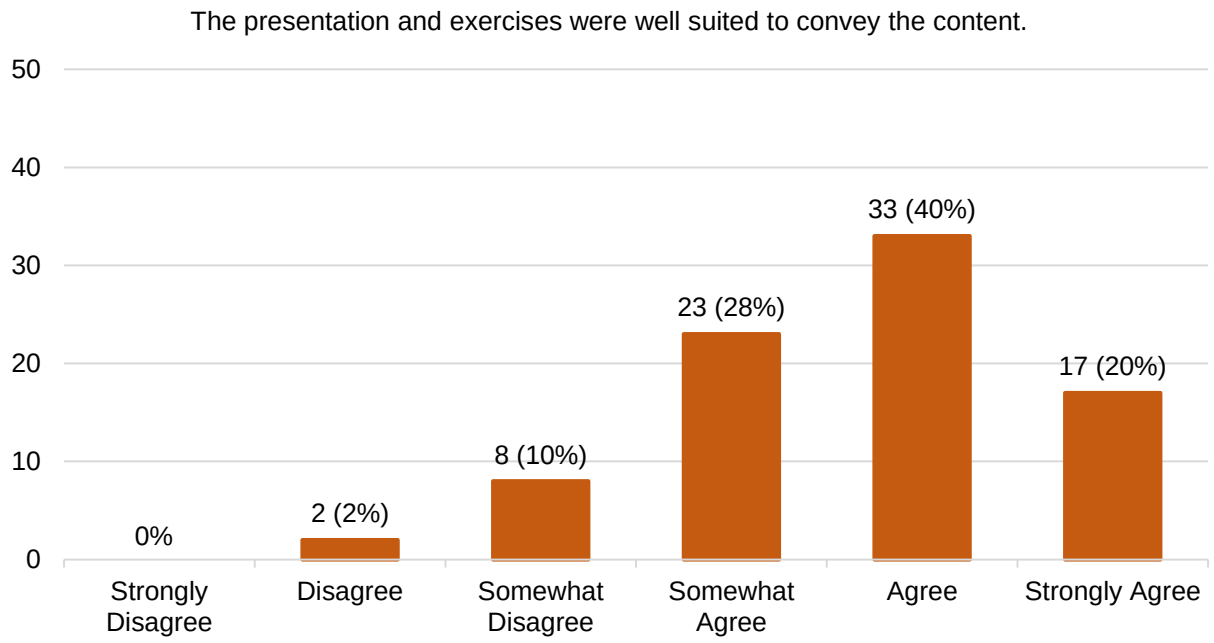


Figure 4-16. Suitability of Classroom Training Content.

Regarding the fourth closed evaluation question of the PRD workshop (see Figure 4-17), more than half of the participants agreed that the trainer was proficient. Almost 30% of the individuals strongly agreed to the proficiency of the workshop instructor. Only 16% of the participants somewhat agreed to the expertise of the trainer. Solely 4% of the workshop attendants somewhat disagreed that the trainer was competent. In general, 81% of the participants found the trainer competent and 16% of them thought the trainer was rather proficient.

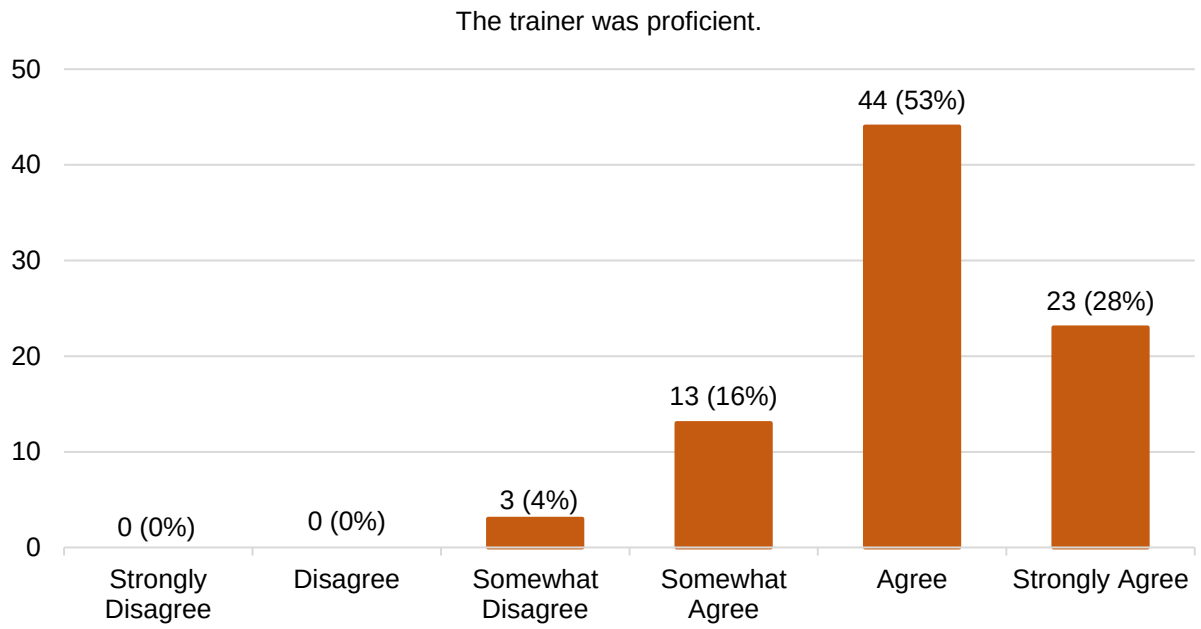


Figure 4-17. Trainer Proficiency in Classroom Training.

The next closed question focuses on the content delivery of the trainer (see Figure 4-18). More than half of the participants agreed to the delivery of the content in a competent way. Besides that, almost one fourth of the individuals strongly agreed and almost one fifth somewhat agreed that the workshop content was provided appropriately. Merely a small percentage of participants disagreed with the statement. Finally, 75% of the workshop attendants acknowledged that the trainer delivered the content in a suitable manner and 19% of them rather agreed to a proficient content delivery.

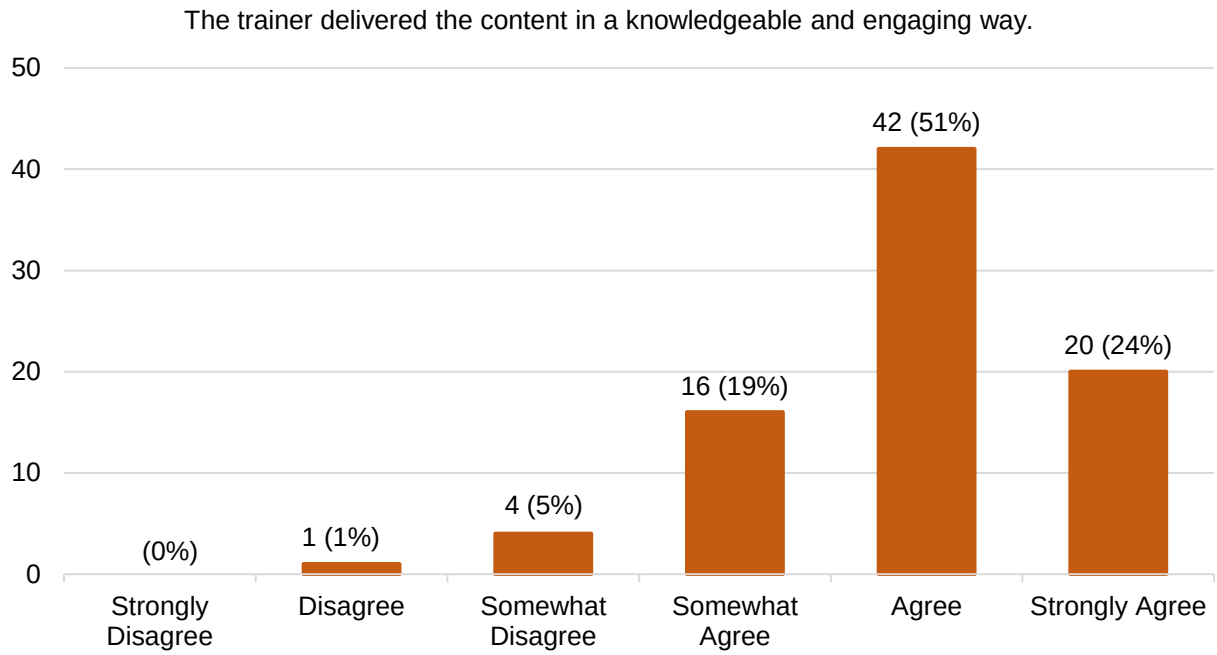


Figure 4-18. Learning Content Delivery in Classroom Training.

The last closed question of the workshop evaluation displays the application of the training content to the job (see Figure 4-19). As a result, 41% of the workshop members somewhat agreed and 35% of the participants agree to be capable of implementing what they have learned to their jobs. In addition, 18% of the attendees strongly agreed to be able to apply the learning content at work. Solely a small percentage of participants disagreed to be able to apply the learning content to their job. All in all, 53% of the attendees saw themselves able to utilize the seminar content in their job and 41% saw themselves rather able to apply the content in their job.

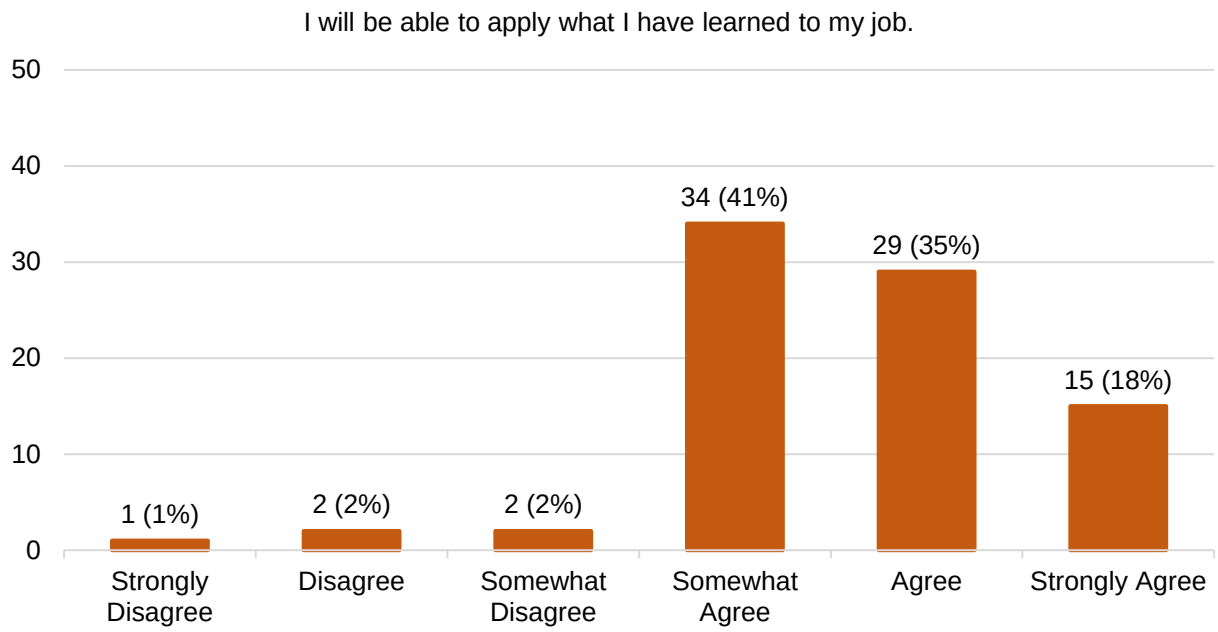


Figure 4-19. Application of Classroom Training Content.

The next section shows the participants' feedback of the four open questions from the classroom trainings. The data has a limited informative value and should only be interpreted as a reference. For the sake of simplicity, the answers were categorized. Several categories could be derived from the individual comments of the feedback.

The first open question addresses what the individuals liked most about the workshop (see Figure 4-20). With 25 responses out of N = 84 data sets, 30% of the feedback providers made a positive reference to the discussions with other colleagues in the workshop. This referred to both small group and group discussions. Next, 20% of the feedback givers liked the setup of the course. This included the compact format, the degree of participation, and the separation into teacher-centered lessons, group and team discussion, and personal exercises. Furthermore, 11% of the feedback providers liked the atmosphere during the classroom training which was described as casual and open. Besides, one tenth of the feedback providers enjoyed the practical exercises and 8% of them liked the combination of the theoretical and practical parts in the workshop. Additionally, 7% of the feedback givers liked the content itself and a similar proportion of the individuals enjoyed the theory. Finally, 4% of the feedback providers

liked both the trainer and the learning materials that included handouts, a list of personal resources, and recommended books, as well as infographics for each PsyCap element.

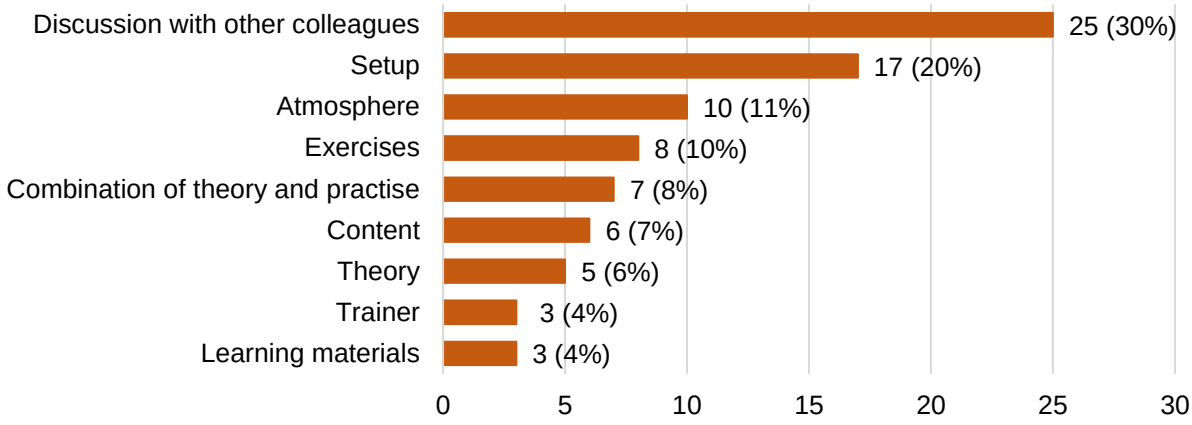


Figure 4-20. What Participants liked most about Classroom Training.

The second open question asked attendees what they would suggest to enhance the classroom training (see Figure 4-21). With 18 responses out of the N = 63 data sets, almost 30% of the feedback providers suggested improving the setup of the workshop by increasing the workshop duration, diving even deeper into the topic, and reducing the number of attendees. Moreover, 21% of the feedback givers would increase the time for group work and discussions, as they enjoyed the format. In addition, 11% of the feedback providers would focus more on specific tools and methods to enhance their PsyCap. Besides that, one tenth of the feedback givers suggested improving the presentation style of the trainer and fewer exercises linked to the learn-targets. Furthermore, 8% of the feedback providers proposed enhancing the learning materials by providing more pre-reading material. Finally, 6% of the feedback providers both had no proposals to enhance the classroom training, nor suggestions to improve the scope of the online survey.

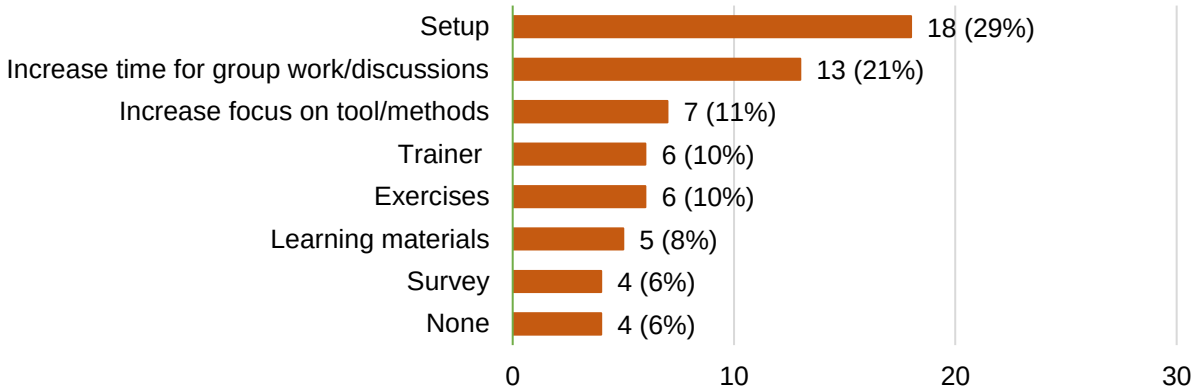


Figure 4-21. Suggestions for Improvement for Classroom Training.

Next, the participants were asked what exactly they have learned in the workshop (see Figure 4-22). With 29 replies out of the N = 86 data sets, more than one third of the feedback providers learned how to set work-related goals and how to visualize them. Besides that, 13% of the feedback givers gained knowledge of the PsyCap concept including its four components. Next, 12% of the feedback providers discovered how to master adversity by having assessed unfavorable events at work and 8% of the feedback givers indicated that they reflected on themselves during the workshop and gained valuable insights. Further, 7% of the feedback providers both acquired information on how to handle obstacles and to identify pathways to reach their work goals. Finally, 6% of the feedback givers both found out to identify personal resources and did not learn something new in the training. Lastly, 5% of the feedback givers valued the discussion and networking with coworkers and 3% of the feedback providers gained further knowledge on positivity.

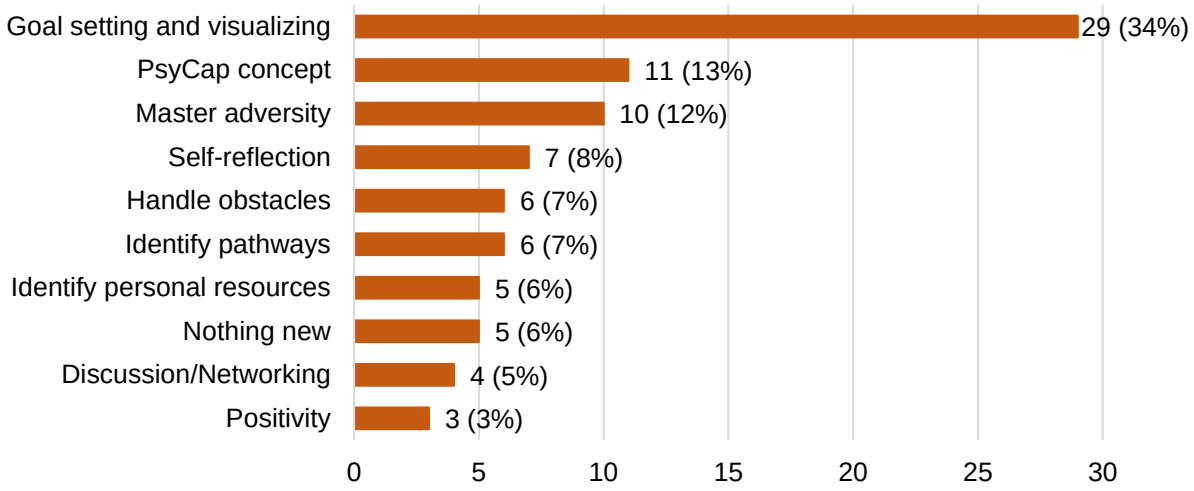


Figure 4-22. What Participants learned in Classroom Training.

The fourth and final open evaluation question at T2 focused on whether participants remembered particularly interesting or exciting videos or exercises. And if so, they were asked why they had remembered them (see Figure 4-23). Like in the gamified online training (study 1), the intention of the question was to find out what caught the attention of the individuals from the workshop. With 25 responses out of the N = 58 data sets, 43% of the feedback givers remembered the video clips from the company leader because they gained insights into the CEO's personality and how to handle personal setbacks as well as overcoming obstacles. Furthermore, almost 15% of the feedback providers recalled the practical exercises (e.g., goal setting and visualizing, pathway exercise) because it helped them to reflect on their own situation. Moreover, 14% of the feedback givers remembered the group work and discussions, as the personal exchange was regarded as very helpful. Furthermore, almost 10% of the feedback providers kept the learning materials (e.g., handouts, list of personal competencies) in mind because they were good templates that could be memorized and used for possible future (work) challenges. Next, 7% of the feedback givers remembered both the video on hope theory and the quotations in the presentation (e.g., from Confucius 'Our greatest glory is not in never falling, but in rising every time we fall'), as they were very illustrative and catchy. Finally, 5% of the feedback providers kept

the focus on personal resources in mind because the mapping of personal strengths brought up new thoughts and helped emphasize what the participants were good at.

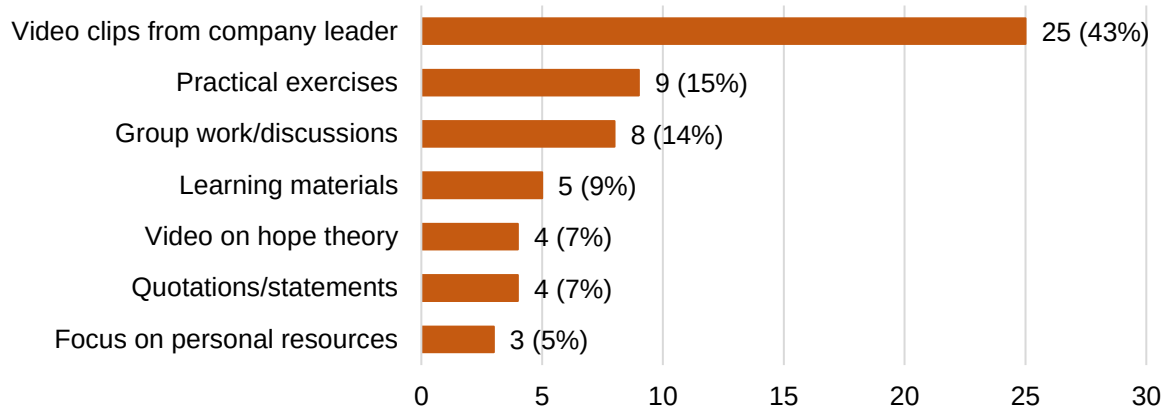


Figure 4-23. What Participants remembered from Classroom Training.

For the third and last measurement point (T3), the participants of the PRD workshops were asked if they applied the learning content in their jobs and if they had experienced a noticeable positive change in their behavior back on the job.

Half of the workshop members (50%) indicated that they somewhat agree to having applied the learning content in their everyday working lives (see Figure 4-24). Moreover, 18% of the course attendees agreed to having made use of the course contents at work and 5% of the participants strongly agreed. Besides that, 22% of the individuals somewhat disagreed to the statement and only a small percentage of the participants were not in line with the statement. To conclude, 23% of the workshop attendees agreed in having applied the learning content from the workshop in their job and 50% of the participants somewhat agreed.

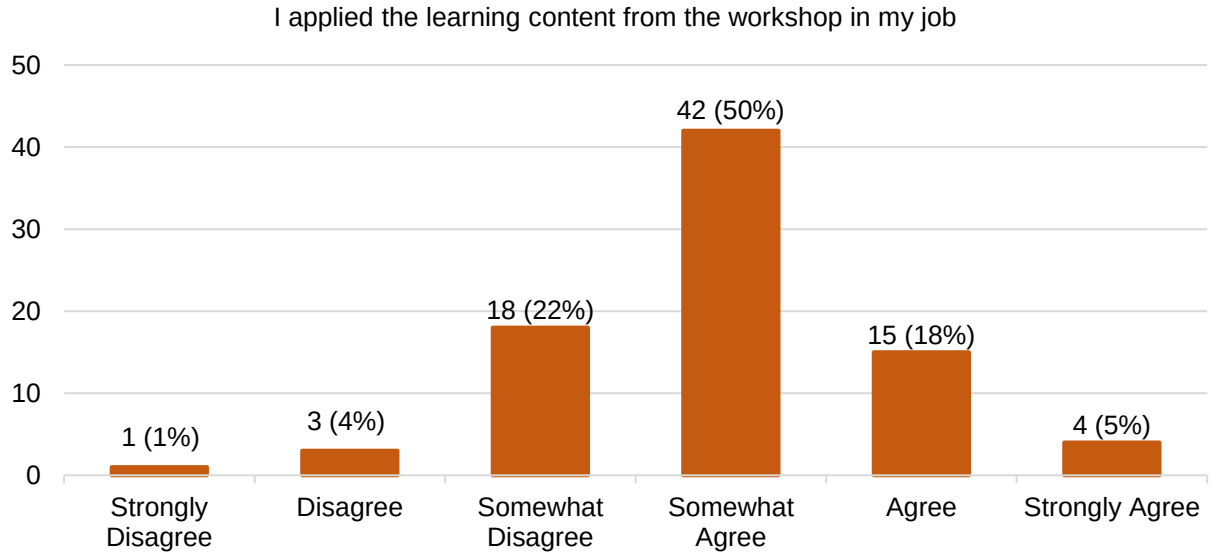


Figure 4-24. Application of Classroom Training Content.

Regarding the last evaluation question for the classroom training at T3 (see Figure 4-25), 43% of the participants somewhat agree to having experienced a noticeable positive change in their behavior when they got back to their job. Additionally, one out of ten agreed to having noticed visible positive behavioral change back at work and 4% of the individuals strongly agreed to having experienced a noticeable positive alteration in their attitude back at work. Furthermore, 27% of the workshop attendees somewhat disagreed and 16% of the individuals disagreed to having perceived positive variation in their behavior back at the job. In sum, 14% of the workshop participants agreed to having experienced a remarkable positive change in their behavior back on the job and 43% of the participants rather agreed.

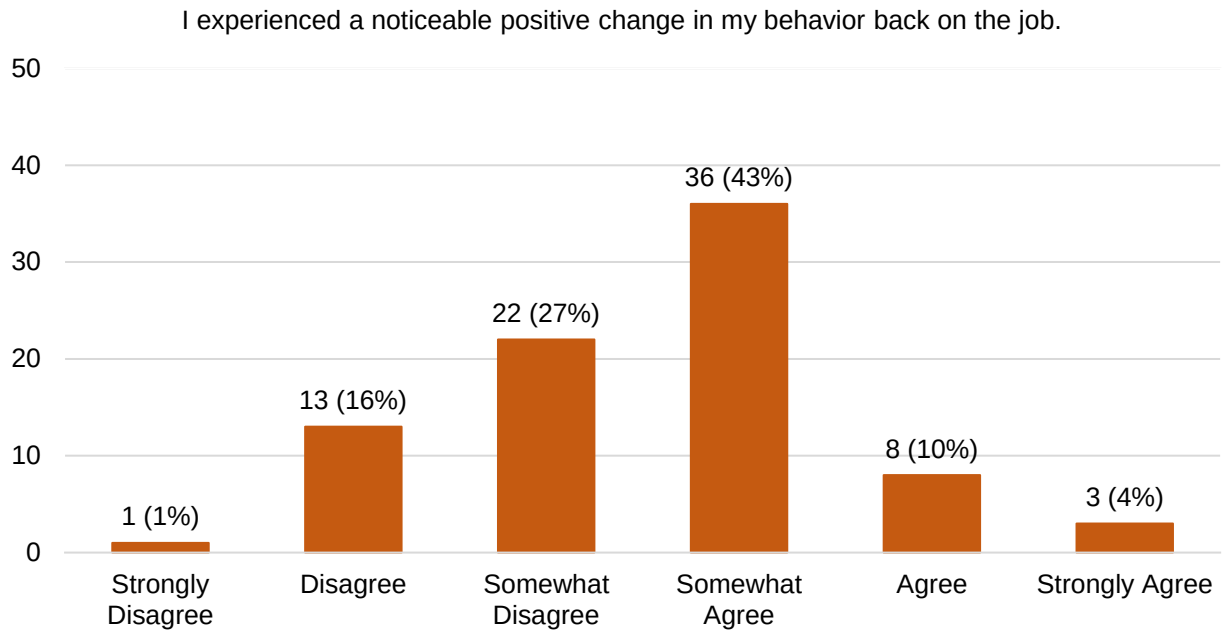


Figure 4-25. Positive Behavioral Change from Classroom Training.

To conclude, the PsyCap classroom trainings were very well received by the participants, which can be seen in the positive feedback in the training evaluation. In particular, the positive feedback in terms of recommendation of the PRD workshops, learning activities, and proficiency of the trainer is worth mentioning. This chapter completes the overall results of the PsyCap classroom trainings, and in the next chapter the results are summarized.

4.3.5 Summary of Results

One of the main goals of this dissertation was to examine if PsyCap as a core construct could be developed in the workplace of a multinational software company through several classroom trainings based on the four elements hope, self-efficacy, resilience, and optimism. In the second study, a total of 113 participants out of the potential reach of 14,877 members in the internal social network of the company (response rate: 0.08%) took part in the online survey at the first time of measurement (T1). However, there were significantly more people on the waiting list who would have liked to participate in the workshop (> 100 interested people, i.e., the PhD candidate could have offered 5 more workshops). This means that the interest in the *Personal Resource Development* training was significantly higher in contrast to the response rate given here. At the second time of measurement (T2), 93 participants (response rate: 82%) filled out the questionnaire and at the third time of measurement (T3) 83 participants (response rate: 73%) completed the questionnaire.

Concerning the control group (CG), like in study 1, 1,205 employees were contacted via e-mail (see Table 2-1). As a result, 219 participants (response rate: 18%) completed the online survey at T1. At T2, 57 participants (response rate: 26%) completed the online survey and at T3, 38 participants (response rate: 17%) completed it. For the comparison with EG 2, the control group number that filled out three measurement points was taken (i.e., CG 2). T-test analyzes revealed that the drop-outs from EG 2 did not differ significantly from the other participants in the measured variables at T1.

Overall, the socio-demographic information such as age, gender, education, employment status, and years of service was consistent with the image of the workforce except for region. Since the classroom trainings took place in Germany, this only gave a limited picture of the company, as the various regions were generally more strongly represented in the organization. Furthermore, the distribution of men (60%) and women (37%) in this study was close to the gender distribution in the organization (male - female ratio: 70% to 30%). In this study, the mean values of the PsyCap scales at all times of testing were consistently high in both groups ($M \geq 4.03$). The standard deviations in both groups took on values between .64 and .90. Overall, there were similar high mean values in WE, JS, and OC as in PsyCap for EG 2 and CG 2. In addition, the standard deviations for these scales took on values between .72 and 1.05 for EG 1 and CG 1.

The statistical analysis of hypothesis 5 revealed no significant main effects nor interaction effect in PsyCap between EG 2 and CG 2. Therefore, hypothesis 5 must be rejected. Regarding the four PsyCap element (hypotheses 5a-5d), the interaction effects did not show significant differences on the hope, self-efficacy, resilience, or optimism scale for EG 2 and CG 2. Hence, hypotheses 5a – 5d need to be rejected. The analysis of hypothesis 6 discovered a statistically significant correlation between PsyCap and job satisfaction (JS) at all measurement points which can be interpreted as medium and high correlation (Zöfel, 2003). Hypothesis 6 can therefore be confirmed. The statistical analysis of hypothesis 7 revealed a statistically significant correlation between PsyCap and work engagement (WE) at all measurement points as well which can be interpreted as high correlations (Zöfel, 2003). As a result, hypothesis 7 can be confirmed. The statistical analysis of hypothesis 8 showed no statistically significant correlations between PsyCap and organizational commitment (OC) for the three measurement points. Hence, hypothesis 8 must be rejected.

Additional results including multiple regression analysis indicated the impact of PsyCap on essential work-related variables such as job satisfaction, work engagement, and organizational commitment. Respectively, 52% of the variance in JS is explained by PsyCap at T1, 60% of the variance in JS is explained by PsyCap at T2, and 56% of the variance in JS is explained by PsyCap at T3. Furthermore, 55% of the variance in WE is explained by PsyCap at T1, 70% of the variance in WE is explained by PsyCap at T2, and 72% of the variance in WE is explained by PsyCap at T3. Finally, 16% of the variance in OC is explained by PsyCap at T2. Other than that, no significant results for PsyCap to explain variance in OC were measured.

In general, the majority of the participants (65%) would recommend the PsyCap classroom training to a friend or colleague and 27% would rather recommend it. All in all, 67% of the participants found the theoretical and practical learning parts balanced and 19% found them rather balanced. Altogether, 60% of the workshop attendees found the presentation and exercises well suited to teach the content and 28% found them rather well suited. Furthermore, 81% of the participants found the trainer competent and 16% of them thought the trainer was rather proficient. Besides, 75% of the workshop members acknowledged that the trainer delivered the content in a suitable manner and 19% of them rather agreed. Regarding the participants' feedback in the open question, the majority of the feedback providers liked the discussions with other colleagues, the general setup (i.e., compact format, degree of participation, teacher-centered lessons, and personal exercises), and the casual and open atmosphere in the workshop. The feedback givers suggest improving the setup (i.e., increase workshop duration, dive deeper into topic, and reduce amount of attendees), increasing the time for group discussions and focusing more on specific tools or methods to enhance PsyCap. In sum, they learned how to set and visualize work-related goals, acquired information about the PsyCap concept, and gained knowledge on how to master adversity (e.g., by working through unfavorable events at work). The feedback providers remembered the video clips from the company's CEO, gained insights into the CEO's personality, and how to handle personal setbacks and overcoming obstacles. Furthermore, they recalled the practical exercises (e.g., goal setting and visualizing, pathway exercise), as they helped them to reflect on their individual situations and remembered the group discussions because the personal exchange was regarded as very helpful to them. Concerning the last measurement point (T3), 23% of the participants agreed in having applied the learning content from the workshop in their job and 51% of them somewhat agreed. Overall, 14% of the participants agreed to having experienced a remarkable positive change in their behavior back on the job and 43% of the participants rather agreed. The following chapter focuses on the discussion and interpretation of the results from the second study and provides implications for future research and practice.

4.4 Discussion

In the following section, the results of study 2 are discussed and interpreted (see 4.4.1). The methodological strengths and limitations of the present study are shown (see 4.4.2) and implications for future research projects and practice in the field of positive organizational behavior are explained (see 4.4.3).

4.4.1 Discussion and Interpretation of the Results

The purpose of this study was to generalize the effectiveness of the PCI when administered by different facilitators other than previous PsyCap instructors such as Luthans and colleagues, to compare the results with those of the gamified online training, and to examine the longevity of the PCI using a two-month follow-up measure. As in study 1, the investigation took place in a real working setting of the same software company and the workshop attendees stem from the development organization of the company. CG 2 includes the same members from the distinct development unit that had the most overlap for job roles with EG 2. The statistical analysis only included data from the respondents of CG 2 at all three measurement points (N = 38). The time required for the workshop is comparable to the gamified online training in study 1 (i.e., four hours).

Discussion of Hypotheses

According to the fifth hypothesis, whether EG 2 showed a stronger increase in PsyCap at the second and third measurement point compared to CG 2, no significant differences could be reported. Hence, hypothesis 5 needed to be rejected. The analysis of the sub-hypotheses, namely whether EG 2 showed a stronger increase in self-efficacy, hope, resilience, and optimism at T2 and T3 compared to CG 2, did not reveal any significant interaction effects. Therefore, the four sub-hypotheses needed to be rejected. Although the observed mean scores for hypothesis 5 and hypothesis 5a – 5d did increase slightly over time, these gains did not differ statistically when compared with CG 2. In particular, CG 2 had very good baseline scores and was the only group that answered the questionnaires at all three times of measurement. Therefore, self-selection bias may have played a role here, as the participants of CG 2 self-assigned themselves to the study conditions. Since the measured mean values in EG 2 in PsyCap (M = 4.18; SD = .66) and its elements (ranging from M = 4.03; SD = .77 to M = 4.26; SD = .87) were already quite high at the first time of measurement, no additional significant increases were achieved by the intervention measure. As in study 1, the possible presence of a ceiling effect may explain the lack of evidence to support hypothesis 5 and hypotheses 5a – 5d. The high PsyCap values at T1 may be due to the fact that the participants already had relatively high positive expectations of the training at baseline. Besides that, other learning courses offered by the investigated company also contain trainings on resilience, optimism and goal-setting courses (hope component of PsyCap). This could be a reason why the learning content was partly already known by the workshop participants which did not lead to an additional significant increase in PsyCap and its components for EG 2. In contrast, although there were no significant results in the statistical analysis, all mean values in the overall PsyCap and it components increased over time indicating a positive trend. These changes may have appeared because the participants felt that the training was not finished with the workshop and applied the learning

content back in the workplace. This could be one reason why behavioral changes may have occurred, according to the statements made by the participants. This is also reflected in the evaluation phase at T3 where 23% of the participants agreed in having applied the learning content from the workshop in their job and 51% of them somewhat agreed. In addition, 14% of the participants agreed to having experienced a noticeable positive change in their behavior back on the job and 43% of the participants rather agreed. However, what limits the validity of the effectiveness of the PsyCap classroom training is the increase in the mean values for PsyCap and its elements (except for hope) in CG 2 over time. The mean values in CG 2 should remain constant over time, as the respondents did not receive any PsyCap training but only completed the questionnaire at the three different points in time. Sometimes changes from the pre- to the post-measurement are not due to the training but to the measuring instruments (Howard, 1980). Therefore, the questionnaire alone may have triggered thinking processes in the participants of the CG 2 and potentially acted as mini-treatment. Moreover, the study design did not allow individual components of the PsyCap development process (i.e., writing, discussion, or self-reflective exercises) to be assessed. Therefore, it is possible that some components of the classroom training worked better than others. However, they were not measured in the training. Concerning the socio-demographic variables such as age, gender, or education, the findings suggest, that these variables do not have a significant impact on PsyCap. This is in line with Avey (2014) who declares that demographic variables are barely associated with PsyCap, and if they are related, the relationship is usually weak. In terms of gender, the results of study 2 show that although there are more men in the development organization, women and men feel equally addressed by topics related to psychological resource training (see Figure 4-3).

Furthermore, a statistically positive significant correlation between participant's PsyCap and their job satisfaction at T1, T2, and T3 was measured. This means high values in PsyCap correspond to high values in job satisfaction. As a result, individuals high in PsyCap appear to be more satisfied with their job. These results confirm previous studies that have shown a link between PsyCap and job satisfaction (Abbas et al., 2014; Luthans, Avolio et al., 2007). In addition, the results from the multiple regression analysis showed that just like in study 1, hope and optimism are significant predictors of job satisfaction. As mentioned earlier, this is in line with previous research that has shown that individuals with higher levels of optimism are less likely to experience the effects of stress in the workplace (Totterdell et al., 2006).

Moreover, there was a significant positive relationship between PsyCap and work engagement. This means high values in PsyCap were related to high values in work engagement. Consequently, the more positive psychological resources (i.e., self-efficacy, hope, resilience, and optimism) a person owns, the more engaged he or she might be at work. These findings confirm previous studies that found a significant relationship between PsyCap and work engagement (Joo et al., 2016). Besides, the findings of the multiple regression analysis showed that hope, optimism, and resilience are significant predictors of work engagement. This suggests that the extent to which workers expect positive outcomes and attribute these outcomes to internal, permanent causes (optimism) is particularly important for the extent to which they feel engaged at work. These results contribute to earlier findings in which (Othman & Nasurdin, 2011) discovered that hope is a predictor of job engagement. In addition, resilient people

have numerous positive qualities such as optimistic and energetic outlook (Block & Kremen, 1996), curiosity, and openness to new experiences (Waugh, Fredrickson, & Taylor, 2008) which result in showing a greater willingness to face challenges in the workplace and ultimately strengthens work engagement (Malik & Garg, 2020). Opposed to the results of earlier studies (Jensen & Luthans, 2006; NGUYEN & NGO, 2020), no significant relationship between PsyCap and organizational commitment was measured at the different measurement points. However, when the organizational commitment scale is divided into the three subscales (affective, continuance, and normative commitment scale), there is a significant positive correlation between PsyCap and the affective commitment scale (ACS) at all measurement points (see Appendix M.2). The data suggest that the more PsyCap a person has, the higher their scores on the ACS. Therefore, the likelihood that individuals will stay with the organization because they want to (i.e., identification with, and involvement with the organization) is high. Besides, significant negative correlations can be detected between PsyCap and the continuance commitment scale at all measurement points which means that the more PsyCap a person has, the lower their values may be on the continuance commitment scale. Hence, the likelihood that the person will stay with the company because he or she has to (i.e., costs employees associate with leaving the company) is low. Lastly, there are no significant positive correlations between PsyCap and the normative commitment scale at the three measurement points. Additionally, the multiple regression analysis showed that there were no significant results for PsyCap to explain variance in organizational commitment at T1 and T3. However, at T2, self-efficacy was found to be a significant predictor for organizational commitment. Overall, the results are only partly consistent with similar research that has examined the relationship between PsyCap and organizational commitment (Youssef & Luthans, 2007). The results from the study by Youssef and Luthans (2007) showed that only employee hope and resilience were significantly positively related to organizational commitment. The fact that overall PsyCap did not reach significance may have to do with the small sample size, and, as previously found (Luthans et al., 2005), may be more relevant in organizations under extreme conditions or undergoing crises or dramatic changes. To the author's knowledge, the relationship between PsyCap and the individual OC subscales has not yet been investigated and the literature is still deficient. Thus, this study contributes to the unclear research situation between PsyCap and the OC subscales. Researchers in this field are encouraged to analyze the relationship between PsyCap and the OC subscales in more detail.

Discussion of Objectivity, Reliability, and Validity

As mentioned in study 1, the objectivity of questionnaire studies can generally be rated as high, since there are clear guidelines regarding the implementation, evaluation, and interpretation (Bortz & Döring, 2016). The reliability of the questionnaires used in this study was primarily examined in terms of the internal consistencies of the scales. As mentioned earlier, reported reliability alphas for PsyCap in the PCQ-24 (stated in 22 studies) range between .75 and .95 (Dawkins et al., 2013). In this study reliability alphas for PsyCap range between .86 and .95 (for both EG 2 and CG 2) which is slightly higher than in the reported studies by Dawkins et al. (2013). Regarding the reliability alphas for the individual PsyCap elements, the review by Dawkins et al. (2013) reports internal consistencies for hope (α = .70 - .87), self-efficacy (α = .70 - .92), resilience (α = .63 - .66), and optimism (α = .63 - .69). In this study, the

internal consistencies for the PsyCap components are the following for hope (α = .82 - .91), self-efficacy (α = .70 - .89), resilience, (α = .64 - .80), and optimism (α = .74 - .84). It is remarkable that the internal consistency for optimism and resilience tend to be consistently lower than those reported for self-efficacy and hope. One reason might be the incorporation of reverse-scored items in the subscales for optimism and resilience, as they can reduce scale reliability (Schmitt & Stults, 1985). In sum, this study finds similar results for internal consistencies related to PsyCap and its elements, contributing to the research literature. All other scales (work engagement, job satisfaction, and organizational commitment) are, according to Bortz and Döring (2016), characterized by moderate to high internal consistencies. The questionnaires used are therefore reliable. Concerning the validity, since the items in the context of this study stem from already validated questionnaires in their original form (see chapter 2.3), it can be assumed that the quality criterion of validity is consequently fulfilled. Nevertheless, the missing randomization of the study participants to the study conditions, reduces the internal validity. To account for external validity, the participants were in the workplace during the classroom training which supports the generalization of the effects. Specifically, the impact of PsyCap classroom training interventions may not be limited to a particular organization, industry, or demographic group. However, just like study 1, there is only one development organization involved in the study including specific work conditions and characteristics that may not be representative of the wider population.

Discussion of PsyCap Training Evaluation

The evaluation of the classroom trainings *Personal Resource Development* addressed three of the four levels from Kirkpatrick (1979) (i.e., reaction, learning, and behavioral change). The fourth level (i.e., results / effects on business by trainee) of evaluation was not measured due to the strictly confidential data protection treatment of the company data, which reduced the significance of the study results. It should be noted that due to the open response format (i.e., voluntarily) of the evaluation questions, a distorted representation of reality due to self-selection of the evaluation questions cannot be ruled out. The data are therefore only of limited significance and should only be interpreted as an orientation.

Concerning the open comments expressed in the feedback (see chapter 4.3.4), 65% of the participants would recommend the PRD classroom training to a friend or colleague and 27% would rather recommend it. This is a very high percentage. It can be concluded that the classroom trainings on PRD were very well received by the participants and the content was considered valuable and useful. Similarly, a large proportion of the participants found the structure of the workshop, namely theoretical and practical learning activities, balanced and the presentation and exercises well suited to convey the content. Regarding the trainer (i.e., the doctoral candidate), an even higher amount of the participants found the trainer competent and agreed that the trainer delivered the content in a knowledgeable and engaging way. Hence, the participants were very satisfied with the competence and content delivery of the trainer. This is why replicating PsyCap workshops is highly important as the success of the conducted PCIs often relies on the facilitator's competence, confidence and articulation (Burke & Hutchins, 2008). These elements are often included when determining the trainees' reactions to the training (Morgan & Casper, 2000). In addition, the effectiveness of training workshops are also strongly influenced by the trainers who perform it (Dello Russo & Stoykova, 2015). This is critical for HR

professionals working in increasingly globalized organizations with dispersed workforces and who want to use evidence-based, homogeneous tools and methods (Dello Russo & Stoykova, 2015).

In sum, with mean values ranging from *M* = 4.60 to *M* = 5.05 (out of *M* = 6.00) at T2, the participants agreed to the six closed questions in the evaluation of the PRD workshop and experienced the PsyCap classroom trainings as very positive. The added follow-up measure eight weeks after the classroom training and the detailed evaluation strengthens the statement about the effectiveness of the PsyCap intervention measure. Measurement at multiple points in time after the intervention measure has been completed is highly advisable, as performance trends cannot always be determined from one-time post-intervention measurements (Hager et al., 2000).

Regarding the four open questions (qualitative approach) of the classroom training, a large proportion of single comments (ranging from N = 54 until N = 70 comments) were received. The discussions and interactions with other colleagues were well received. This is a very valuable feedback as Luthans et al. (2010) emphasize that guided small group discussions are a crucial element of delivering the Psychological Capital Intervention. In addition, several studies have shown that higher levels of trainer-learner or learner-to-learner interaction lead to higher learner motivation, more positive attitudes toward learning, and improved learning outcomes (Hackman & Walker, 1990; Wagner, 1994). Overall, the participants enjoyed the setup of the course (i.e., compact format of 4 hours, degree of participation, teacher-centered lessons, group and team discussion, and personal exercises). Both the practical exercises and the combination of theory and praxis were appreciated in the workshop. The feedback providers proposed to improve the setup of the workshop (i.e., increase workshop duration, dive deeper into the topic, and reduce the amount of training participants.

To check if EG 2 had learned what they should have learned in the PRD workshop, the third open question was given. The majority of the feedback givers answered that they had learned ‘how to set work-related goals and how to visualize them’ which addressed the hope component of PsyCap. Furthermore, the feedback providers acquired knowledge about the PsyCap concept itself, and how to master difficulty by evaluating adverse events at work (the resilience component of PsyCap). Additionally, they gained valuable insights by applying self-reflection throughout the classroom training while also having acquired information on how to deal with goal blockages and pathways to reach their work-related goals (the hope component of PsyCap). By discussing individual adverse events and challenges at work with colleagues, this led to valued conversations and the feeling of being accepted and being heard increased. To conclude, regarding the comments in the open answer format, the workshop members learned what they should have learned in the PRD training. However, there was no targeted learning control in the form of a test.

At the last measurement point (T3), almost three-fourth of the PRD workshop members agreed that they had applied the learning content in their job and more than every second participants agreed to having experienced a remarkable positive change in their behavior back on the job.

In sum, although the observed mean scores did increase slightly in PsyCap and its elements over time, these gains did not differ in a statistically significant way when compared with CG 2. However, by including a two-month post-intervention PsyCap follow-up measurement and using a comprehensive evaluation, this study added value by helping to expand knowledge about the longevity of PsyCap interventions. By carrying out follow-up measurements, it is possible to determine whether the increase in PsyCap persists over time or to identify long-term effects that may have remained hidden in the subsequent measurement (Hager et al., 2000).

4.4.2 Strengths and Limitations of Study 2 – Classroom Training

In the following, several strengths and limitations concerning study 2 are illustrated, which impact the significance of the results. At least three major strengths of study 2 must be acknowledged. First of all, the possibility of examining the longevity of the PsyCap intervention (PCI) stands out as a strength of the study. The participants were tested at three times, namely before (T1), after (T2), and eight weeks after (T3) the PsyCap intervention. This allowed to examine the longevity of the face-to-face training effects over a longer period of time. Even if the study did not show a significant increase in PsyCap and its elements compared to CG 2, there was a positive trend in the mean values across all measurement points.

Second, the study design made it possible to draw attention to the PsyCap micro-intervention and important findings on the relationships of PsyCap to critical work-related variables such as job satisfaction, work engagement, and organizational commitment. The PsyCap intervention required little time (4 hours) and provided participants with easy opportunities to interact with each other in discussions which was considered very helpful and valuable. This is in line with Luthans et al. (2010) who emphasize that guided small group discussions are a crucial element in the implementation of PsyCap interventions.

Having conducted the study on site and in a field setting was another positive attribute of this study. This project involved an organizational census in a development organization of a multinational software company. While conducting field research often poses many challenges, managers and colleagues have been very supportive of the project. They provided information when needed, offered logistical support for the training courses, and encouraged participation. Finally, there was great interest in the PsyCap face-to-face training. Although the response rate of 0.08% (113 participants completed the online questionnaire at T1 out of the potential 14,877 members of the company's development group) appeared very low, there were over 110 people on the waiting list for the workshops in total. Accordingly, at least 5 or 6 more workshops could have been held with this number of people. However, due to time constraints, more workshops were not offered.

As in study 1, at least three major and two minor limitations of the present study must be acknowledged. First, there is lack of randomization of the trial participants to the experimental conditions just like in study 1. There was no allocation of the subjects to the 'treatment' and the 'control' group. When individuals are randomly assigned to a test condition, all potential confounding variables are expected to have the same distribution under all test conditions. However, in organizational psychological studies, randomization of study participants is often rarely possible (Freund & Holling, 2007). This was also the

case in the present study which may raise doubts on the internal validity of the PsyCap intervention because of the potential non-equivalence of the groups (Dello Russo & Stoykova, 2015).

Second, as in study 1, the participants registered themselves voluntarily for the classroom training. Anyone who was interested in developing their positive psychological resources could join the course if seats were available. This could mean that the participants who registered for the PRD workshop were already interested in the topic. Other individual components that declare the self-selection of the sample such as intrinsic motivation or openness to new experiences were not measured. Nonetheless, this reflects the attendance of employees in training and development activities within organizations. A wide range of learning courses and events are offered by the company, but the reasons for participating in the respective trainings remain unknown.

The third major limitation is the small sample size with 38 (CG 2) and 83 (EG 2) participants in each group for the three measurement points. This may have caused difficulties in finding significant changes in the data.

Moreover, social desirability, the tendency to answer the questions in an survey in a socially desirable way (i.e., more positively), was not measured with the online survey and could therefore not be controlled for its effect, which is a minor limitation of the study. Social desirability may have led the participants to choose a more positive response category which is a further limitation within this study.

Furthermore, some participants cancelled the PsyCap workshop at short notice or simply did not come to the workshop. For the control group 2, only 38 participants (out of 219 participants from the pre-test) completed all three surveys. This was mainly related to the fact that many participants either only completed the questionnaire at T1 (pre-test), or only at T1 and T2. Another interpretation suggests that the employees in the organization were "survey-tired" as there are many such inquiries.

Finally, one minor limitation of the study relates to the physical presence of the participants. The PRD workshop participants needed to be physical present for the training. As mentioned earlier, some participants canceled the workshop at short notice (an average of 2 participants per workshop), possibly because a more important work-related appointment had occurred. The participants could not make up for the workshop because the dates were set in advance and a limited number of participants was planned.

4.4.3 Implications for further Research and Practice

Face-to-face developmental interventions comprised of participants' hope, self-efficacy, resilience, optimism, and overall PsyCap can be achieved in a relatively low-cost, convenient, and effective manner. However, in this research study significant differences in PsyCap and its components between EG 2 and CG 2, as well as over time cannot be confirmed. Just like in study 1, future studies need to focus on the conditions under which PCI approaches are effective in the workplace, especially in development organizations of global high-tech corporations with multinational staff. In addition, further research is needed to examine the longevity of the classroom training effects over a longer period of time (e.g., 6 to 12 months) and investigating potential follow-up exercises to extend the effectiveness without conducting the same training again (Dello Russo & Stoykova, 2015). While the eight-week duration for post-training follow-up measurement is practical, it is possible that a shorter or longer period

may produce different results. The participants in both treatment groups (gamified online and classroom training) already had high levels of PsyCap as well high levels in the work-related variables. As suggested by Dello Russo and Stoykova (2015), future investigations could examine the distinct impact of the PCI on individuals starting with higher or lower PsyCap levels and identify who reacts more efficiently. When looking at web-based versus conventional face-to-face training, Sitzmann et al. (2006) found in their meta-analysis that web-based approaches may be more effective than traditional PsyCap classroom trainings. These findings speak for the use of online training measures. However, when it comes to group work, participants in web-based training face greater challenges than in face-to-face courses (Smith et al., 2011). In addition, research is yet to determine whether the development of all four components is actually necessary to achieve the desired effects of PsyCap development (e.g. increased job satisfaction or work engagement). In other words, it may be possible that by focusing on the development of one or two PsyCap components, similar intervention effects could be observed as with the development of the entire PsyCap (Luthans et al., 2010). This research approach could lead to the development of even more cost- and time-effective PsyCap interventions.

In terms of training evaluation, future studies could include the fourth level of evaluation (i.e., results) from Kirkpatrick (1979) to measure and analyze the impact the PsyCap training has had at the business level. Examples could be objective performance data or the return on investment (ROI) from the training. Overall, the benefits of PsyCap interventions should be predominant in terms of the invested costs meaning to produce a positive return on investment. Initial utility analyzes have estimated a robust ROI in over 200% for a PsyCap training intervention (Luthans, Youssef, & Avolio, 2007c).

One major contribution of this study comes from the multiple regression analyzes conducted to examine the influence of key work-related variables on PsyCap. Most notable is the impact of job satisfaction and work engagement to PsyCap. Organizations will continue to look for ways to create great workplaces where employees can thrive to drive important outcomes in organizations. Future research could examine potential differences in PsyCap interventions with high-performing and low-performing organizations. Herewith, ceiling effects could be further researched. Lastly, future researchers are encouraged to explore the potential presence of PsyCap antecedents such as job characteristics, personality traits, or leadership styles for PsyCap interventions (Avey, 2014) in development organizations. Building on the research reviewed and presented in this study, future researchers are encouraged to pursue these and other interesting questions to better understand PsyCap, its mechanism of effect, and impact on work-related variables.

To conclude, the Psychological Capital Intervention (PCI) is an approach that Human Resource Development (HRD) practitioners can apply to develop employees' positive psychological capabilities in the workplace. It is highly beneficial for organizations to integrate POB in general and PsyCap (i.e., self-efficacy, hope, resilience, and optimism) in particular into their organizational structure and culture to positively impact employees and their performance. The purpose of this study was to generalize the effectiveness of the PCI when administered by facilitators other than previous PsyCap instructors (i.e., Luthans and colleagues), to compare the results with those of the gamified online training, and to examine the longevity of the PCI using a two-month follow-up measure. To date, research on PsyCap

has not undertaken an empirical investigation of the comparison of gamified online trainings and classroom trainings based on the four PsyCap elements. This study closed the gap and served as a reinforcement for future research studies aiming at not only introducing follow-up measures and utilizing different workshop facilitators, but also supporting theory-based and practically tested PsyCap interventions. This POB research showed that conducting a PCI at work through a classroom training approach can be a valuable tool to make employees aware of their PsyCap resources to enhance them. In addition, the results encourage leaders and HR professionals to apply the PCI model to meet the needs of their employees and their organization. Only with further research that takes these factors into account can HRD professionals evaluate the quality and decide on their application in organizational settings. Future research is required to verify the effectiveness of PsyCap classroom trainings and its influence on further work-related variables to positively affect employee well-being that can then lead to viable business results.

Chapter 5 : General Discussion and Outlook

In this thesis, four different groups of investigation, namely EG 1, EG 2, CG 1 and CG 2 were examined. EG 1 and EG 2 received a brief PsyCap training whereas CG 1 and CG 2 received no training. To allow conclusions to be drawn about the effectiveness of the PsyCap training, pre- and post-measurements were necessary. Study 1 consisted of a pretest-posttest nonequivalent control-group experimental design and study 2 was comprised of the same design including one follow-up measure after two months to determine the effectiveness of the PCI over time. The survey respondents were asked to complete an online survey at two (study 1) and three (study 2) different times of measurement: Before the PCI (T1), directly after (T2) and two months after their participation in the PCI (T3). The results of the control groups, which received no treatment, were measured alongside the results of the two experimental groups. This chapter concludes with a discussion and interpretation of the results of the conducted studies (chapter 5.1) followed by the strengths and limitations of the investigations (chapter 5.2). Implications and directions for future practice and research are given (chapter 5.3) as well as a final conclusion (chapter 5.4).

5.1 Discussion and Interpretation of the Results

The goals of the present thesis were threefold: (1) Comparing the two training methods (gamified online training and classroom training) in terms of effectiveness, (2) investigating the longevity of the PCI using a two-month follow-up measure (see study 2); and (3) extensively evaluating both PsyCap trainings. This thesis comprises an empirical research approach to examine the utility of the POB construct of PsyCap. Both studies included data collected independently to investigate the operationalization of PsyCap at the individual level within the development organization of a multinational software corporation. The first study (see chapter 3) was concerned with developing employees' PsyCap using gamification techniques to assess if the participants had higher mean values after the gamified online training *HERO of the Jungle* in contrast to CG 1. The second study (see chapter 4) examined the PsyCap enhancement of employees who participated in a half-day classroom training in contrast to CG 2. Table 5-1 provides an overview of the comparison of the study results from the gamified online and classroom training.

Table 5-1

Comparison of Study Results from Gamified Online Training and Classroom Training

	Study 1: Gamified Online Training *HERO of the Jungle*	Study 2: Classroom Training *Personal Resource Development*
Socio-demographic information	- Data consistent with image of workforce except for gender - No statistical differences between EG 1 and CG 1	- Data consistent with image of workforce except for region - Statistical differences between EG 2 and CG 2 in work region, age, education
Gamification elements	- Badges and team function rarely used - Few participants reached highest level	- Not available in Classroom training
Descriptive statistics	- All scales (EG 1) showed positive trend in mean values over time except for OC - All scales (CG 1) showed negative trend except for OC; SE & WE stayed the same - Right-hand distribution for PsyCap and its elements (EG 1, CG 1) - Reliability of all scales (PsyCap, WE, JS, OC) sufficient (α > .70)	- All scales (EG 2) showed positive trend in mean values over time except for OC - All scales (CG 2) showed positive trend except for HO, WE, JS, OC - Right-hand distribution for PsyCap and its elements (EG 2,CG 2) - Reliability of all scales (PsyCap, WE, JS, OC) sufficient (α > .80)
Inferential Statistics	- Significant main effect for PsyCap, self-efficacy, resilience - Significant interaction effect with group for PsyCap when controlled for gender (in high and low-engaged group; weak effect) - Reject H1, H1a-1d due to no significant interaction effects - Confirm H2, H3, reject H4	- No significant main effects or interaction effects for PsyCap and its elements - Reject H5, H5a-5d due to no significant interaction effects - Confirm H6, H7, reject H8
Influence on work-related variables	- PsyCap explained variance in JS: 37% at T1, 52% at T2 - PsyCap explained variance in WE: 50% at T1, 60% at T2 - PsyCap explained no variance in OC at T1 and T2 - Overall, strong variance explanation in JS and WE by PsyCap at T1 and T2	- PsyCap explained variance in JS: 52% at T1, 60% at T2, 56% at T3 - PsyCap explained variance in WE: 55% at T1, 70% at T2, 72% at T3 - PsyCap explained variance in OC: 16% at T2; no further significant results - Overall, strong variance explanation in JS and WE by PsyCap at T1, T2, T3 and medium variance explanation in OC by PsyCap at T2

Comparison of Study Results from Gamified Online Training and Classroom Training (continued)

	Study 1: Gamified Online Training *HERO of the Jungle*	Study 2: Classroom Training *Personal Resource Development*
Post-training evaluation	- Majority of participants would recommend gamified online training to colleague or friend, found theoretical and practical learning activities balanced, and exercises well suited to teach PsyCap content - PsyCap learning content rated very well (4 out of 5 possible stars) - Participants liked format and design of HERO training and 1/3 saw themselves as being able to apply what they had learned to their job	- PsyCap classroom trainings were very well received - Majority of participants would recommend them, found theoretical and practical learning activities balanced, and exercises well suited to teach PsyCap content - Participants found trainer proficient, liked (small) group discussions, general setup, casual and open atmosphere - Applied learning content to job (Follow-up at T3): 23% of participants agreed, 51% somewhat agreed - Experienced noticeable positive change in behavior back on the job (Follow-up at T3): 14% of participants agreed, 43% somewhat agreed.

Socio-demographic information. Since demographic data are often controlled in PsyCap studies (Avey, 2014; Lizar et al., 2015), they were also controlled in this thesis. Overall, the socio-demographic data collected (i.e., work region, age, education, employment status, and company affiliation in years) in both studies were consistent with the image of the workforce in the organization examined. The majority of the employees had been working work full-time in the different regions and both age and length of service were heterogeneous.

When comparing the socio-demographic information in the two studies, the participants were similarly distributed except for work region and gender. Since the classroom trainings took place in Germany, the representation of the work region in study 2 only provided a limited picture of the company, as the different regions were generally more strongly represented in the development organization of the company. Furthermore, gender was distributed differently in the two studies. In study 1, the distribution of women (56%) was slightly higher than the distribution of men (42%). In study 2, the distribution of men (60%) and women (37%) in this study was close to the gender distribution in the entire organization (male - female ratio: 70% to 30%). Although there were more men in the development organization, women in study 1 (EG 1 and CG 1) felt more strongly addressed to (positive) psychological topics than men. The gender distribution of EG 1 showed that women felt slightly more attracted to the topic of gamification in combination with the PsyCap online training. To date, only few studies have examined gender differences in a gamification context. In two recent review articles on gamification (Hamari et al.,

2014; Seaborn & Fels, 2015), only two out of the 47 studies examined gender differences. These studies showed that women were more attracted to badges (McDaniel, Lindgren, & Friskics) and were generally less motivated by games (Eickhoff, Harris, Vries, & Srinivasan, 2012). The latter result was confirmed in a further study, according to which game mechanics had a positive motivational effect with male students but neither motivational nor performance effects in female students (Pedro, Lopes, Prates, Vassileva, & Isotani, 2015). In addition, Codish and Ravid (2017) suggest that gender may moderate perceived playfulness in a gamified setting.

This concludes that future studies of gamification in the context of PsyCap should consider gender differences to draw better conclusions about their impact on employee motivation and engagement. The results of the two studies show that it is not possible to say in general whether men or women are more attracted to (positive) psychological topics. One explanation may be that it rather depends on the format and method in which these topics are addressed.

In addition, Chi-square test showed that there were no statistical differences between EG 1 and CG 1 in terms of socio-demographic data in study 1 but there were statistical differences between EG 2 and CG 2 in terms of work region, age, and education. Concerning the work region, as the PRD workshops took only place in Germany, the rest of the regions are little represented in EG 2 whereas the CG 2 could have come from any region. This is one reason why the differences might have occurred. Regarding age and education, one reason for the differences in the variables in both groups might be the sample size which is much higher in EG 2 ($N_{T1\text{-}T3}$ = 83) than in CG 2 ($N_{T1\text{-}T3}$ = 38). Therefore, the comparability of the results in both groups is limited and this data only serves as additional information about the nature of the organization. Consequently, the socio-demographic results reported in this thesis may not be generalizable to other types of employees, industries, job roles, or organizational cultures.

Gamification elements. The gamification techniques in study 1 seemed to have great potential impact for engagement and sustainability of psychological resources, but still need to be developed and researched. With regard to this thesis, the gamification elements (i.e., experience points (XP), badges, and team function) were little used. There was no real group interaction between the participants in the gamified PsyCap training in contrast to the group discussions in study 2, which limited the social interaction aspects in study 1. In addition, only few participants reached the highest training level. The majority of the participants (63%) earned up to 49 XP and achieved an average of 59 XP, which can be equated with having reached the second level in the gamified online training. When designing gamification elements, they should be as intuitive and understandable as possible, complexity should be kept low, and information deficits should be avoided (Stieglitz, 2017). Although there is scientific evidence of the positive effects of gamification in general, there are still large differences in the effectiveness of gamification in different contexts and user groups (Hamari et al., 2014). Furthermore, the diversity and complexity of different gamification approaches make selection decisions and evaluation of success difficult (Stieglitz, 2017).

One important aspect when discussing the effectiveness of gamified online trainings is that if the mechanics behind such gamification approaches are misleading or unknown, this can reduce the

attractiveness for users (Stieglitz, 2017). Moreover, if the assignment of rewards and status appears randomly, the motivation of the user to attain the set goals decreases. It is therefore important to clearly communicate the mechanics behind a particular gamification element and the rollout of gamification elements must be carefully planned. However, these aspects were ensured in the gamified online training by independent employees who tested the gamified online platform in advance, as well as an internal website with instructions and technical information on how to use the gamified platform.

Another aspect when discussing the effectiveness of gamified online trainings is that gamification is not for everyone. Some individuals are simply not interested in the topic of gamification. This may also be a reason why a large number of employees did not participate in the gamified online training and stopped after T1. The response rate in study 1 was 22% at T2 in contrast to the response rate in study 2 with 82% at T2 and still 74% at T3. Other reasons for the low participation rate might have been the time constraints of the participants who still had to do their daily work in addition to the training, or technical difficulties on the gamified online platform. Maintaining initial motivation of the participants throughout an open eLearning course is a major challenge. According to Jordan (2015), it is common for only about 15% of the participants to actually complete a course successfully. Although the completion rate of other Internet-based intervention studies was not dissimilar (Cook, Heath, & Thompson, 2000; Jordan, 2015), the completion rate in the *HERO of the Jungle* training was low (14%) compared to the classroom trainings (73%), which reduced the significance of the training. In the gamified online training, the majority of the participants (63%) stayed at level 1 and consumed only 20% of the overall PsyCap learning content. As mentioned earlier, the time given to employees for learning is not necessarily one of the tasks to which the workforce readily devotes itself, nor is it a top priority (Shelton & Darling, 2003). Improving skills, however, enables employees to be better integrated into the company's processes. In addition, it provides greater motivation so that the employees can work more effectively.

Descriptive statistics. The mean values of the PsyCap scales at T1 and T2 in study 1 were consistently high in EG 1 and CG 1 ($M \geq 4.17$). All PsyCap scales in EG 1, including PsyCap itself, showed a positive trend in their mean values between T1 and T2. In study 2, the mean values of the PsyCap scales at T1, T2, and T3 were consistently high in EG 2 and CG 2 ($M \geq 4.03$) as well. Overall, all scales in EG 1 and EG 2 indicated a positive trend in the mean values over time except for organizational commitment (OC) and a negative trend in CG 1 except for OC. Self-efficacy and work engagement (WE) in CG 1 stayed the same over time. All scales in CG 2 indicated a positive trend except for hope, WE, JS, and OC. In sum, the mean values for EG 1 for the PsyCap resources at T1 varied between $M = 4.16$ and $M = 4.55$ and between $M = 4.41$ and $M = 4.80$ at T2 both indicating a right-hand distribution. The mean values for EG 2 for the PsyCap resources at T1 varied between $M = 4.03$ and $M = 4.26$, between $M = 4.28$ and $M = 4.54$ at T2, and between $M = 4.30$ and $M = 4.60$ at T3 all indicating a right-hand distribution. The mean values for CG 1 and CG 2 for the PsyCap elements indicated right-hand distributions at the different measurement points as well.

Overall, the results of the descriptive statistics show that the mean values for PsyCap and its elements were consistently high at baseline (T1) for both studies. One explanation for the high initial PsyCap values may lie in external factors such as a general positive mood in the organization. The presence of

appreciative communication, social aspects such as mutual exchange and support contribute to the high PsyCap. The presence of these factors can also have a positive influence of employee engagement, satisfaction, and commitment at work (Chaudhuri & Ghosh, 2012; Paillé, Bourdeau, & Galois, 2010), which is also reflected in the high baseline values of JS, WE, and OC in the different samples. Therefore, such factors should also be considered in future studies. Another explanation for the high PsyCap values is that the development organization supports many such psychological training courses. Therefore, the employees are encouraged to continuously enroll in such courses. This contributes to the fact that there is already a certain awareness of psychological training topics among the employees which might explain the high PsyCap baseline values. In addition, the company is already doing a lot in the area of incentives such as the engagement in appreciation and innovation awards, or the promotion of health & well-being topics as well as initiatives to enhance diversity and inclusion in the workplace. If the company does a lot of positive things for its employees, they will be more engaged, satisfied, and committed at work. The high baseline values for work engagement, job satisfaction and organizational commitment may be as well reflected by these incentives. Additionally, self-selection bias may have also played a role here, since the participants of EG 1, EG 2, as well as CG 1 and CG 2 self-assigned themselves to the study conditions.

Furthermore, the quality of the scales was analyzed by reliability analyzes which is often recommended in the literature on questionnaire design (Bühner, 2011; Kallus, 2016). Overall, the reliability of all scales (i.e., PsyCap, work engagement, job satisfaction, and organizational commitment) in the online survey are comparable in both studies and can be considered sufficient (Bortz & Döring, 2016). In study 1, all scales are $\alpha > .70$ (except for resilience in EG 1 at T1 and T2 and for optimism in EG 1 at T2) and in study 2, all scales they are $\alpha > .80$. Hence, the internal consistencies are considered sufficient in both studies (Bortz & Döring, 2016), which means that the online questionnaire measures what it should measure. The reliabilities of all scales in study 2 are a little bit higher than in study 1, which means that the questionnaire in study 2 is slightly more reliable than the one in study 1.

Inferential Statistics. The hypotheses 1 and 5 of this thesis tested whether the participants had higher PsyCap values after the gamified online training and classroom trainings compared to the control group. The control group is treated in the same way as the training group, except, they do not receive the training to be evaluated. In sum, there were no significant interaction effects in study 1 for PsyCap and its elements between the two groups over time. Therefore, hypothesis 1 and the four sub-hypotheses 1a-1d needed to be rejected. In the second study, the PRD classroom trainings showed no statistically significant differences in PsyCap and its components between EG 2 and CG 2 over time. Therefore, hypothesis 5 and hypotheses 5a-5d needed to be rejected. The results from study 2 reflect the results from study 1 for PsyCap and its elements. These results are in contrast to previous research findings that have shown significant increases in PsyCap with a small effect size ($d = .19$) for PsyCap online trainings (Luthans et al., 2008) and small to medium effect sizes ($d = .31$ - $.40$) for PsyCap classroom trainings (Luthans et al., 2010). Hence, the results of the previous studies could not be replicated in the development organization of the multinational software corporation. The high PsyCap scores at the time

of the pre-test (T1) in both studies indicate the possibility of a 'ceiling' effect which allowed a limited opportunity for the ratings to increase from pre-test to post-test. The participants may already have had relatively high positive expectations at baseline. This may be a reason for the high PsyCap values at T1. Additionally, these results could be due to the overlay of parallel trainings that the employees attend between the PsyCap trainings. Therefore, it is difficult to accurately determine the effect of the PsyCap trainings when other trainings are running in parallel. Moreover, other internal learning opportunities offered by the examined company also include training on confidence, resilience, optimism, or goal-setting (hope component of PsyCap). This may be a reason why some of the learning content was already known to the participants, which did not lead to an significant increase in PsyCap and its components in EG 1 and EG 2. Hence, the results need be considered in the overall context and cannot be considered in isolation, not even with the control groups. In particular, CG 1 and CG 2 had better baseline scores for PsyCap and its elements compared to EG 1 and EG 2. Self-selection bias may have played a role here, as the participants of CG 1 and CG 2 self-assigned themselves to the study conditions. In addition, the online questionnaire may have triggered thinking processes in CG 1 and CG 2 participants may have acted as a mini-treatment. Sometimes changes from the pre- to the post-measurement are not due to the training itself but to the measuring instruments (Howard, 1980). That could have occurred here as well. The mean values in PsyCap and its four components increased in both studies over time for EG 1 and EG 2. Even though no significant increase in PsyCap and its elements could be reported in the first and second study in comparison to the control groups, a positive trend in the mean values is evident across all measurement points. Therefore, there is a positive trend for PsyCap and its elements from baseline (T1) in both training methods. A greater positive trend in overall PsyCap was observed for the gamified online training (d = .28) than for the classroom training (d = .25) at T2. On the one hand, this positive trend could have come about because the participants engaged with the PsyCap training content. On the other hand, the difference could be due to the fact that the participants became accustomed to the questionnaire.

Concerning the examination of the longevity of the PsyCap intervention when using a two-month follow-up measure, this was only possible in study 2. However, a positive tendency can be observed concerning the mean values of PsyCap and its elements in study 1 and 2 over time. At T3, the increase in PsyCap for the classroom training was even greater compared to the baseline (d_{T3-T1} = .32). One reason for this increase may be that the participants felt that the training was not finished with the workshop and that they could apply the learning content back in the workplace. This could explain why behavioral changes occurred according to the participants. This is also reflected in the evaluation feedback at T3, where 23% of the participants agreed that they had applied the learning content from the workshop in their job and 51% of them somewhat agreed. Even if the mean values did not become significant in both studies, they go in the expected direction. Recent meta-analytical outcomes showed that web-based teaching can be just as effective, or even more effective, for certain types of learning, than traditional face-to-face teaching (Sitzmann et al., 2006). Such findings support the use of online training measures. However, when it comes to group work, participants face greater challenges in web-based training than in face-to-face courses (Smith et al., 2011).

Furthermore, the analyzes of hypotheses 2 (study 1) and 6 (study 2) revealed significant positive relationships between PsyCap and job satisfaction in both studies. Besides, hypotheses 3 (study 1) and 7 (study 2) described significant positive associations between PsyCap and work engagement. These findings were consistent with previous research which explored the relationship between PsyCap and job satisfaction (Abbas et al., 2014; Luthans, Avolio et al., 2007) as well as PsyCap and work engagement (Joo et al., 2016). Hypotheses 4 (study 1) and 8 (study 2) displayed that PsyCap was not positively related to organizational commitment which is inconsistent with previous research (Jensen & Luthans, 2006). According to the additional variables measured in the two studies (i.e., work engagement, job satisfaction, organizational commitment), the mean values in EG 1 and EG 2 improved over time in the two conducted studies except for OC.

Concerning the control groups, the mean values in CG 1 only improved in JS while they stayed the same over time in WE and slightly decreased in OC. In CG 2, the mean values did not show a positive trend over time in WE, JS, or OC. Both control groups confirm that the values only change little or remain the same over time, which was intended, since no PsyCap training was performed. The mean values in both CGs were expected to remain constant over time because the respondents did not receive any PsyCap training, but only completed the questionnaire at the various points in time.

Influence on work-related variables. Additional results of multiple regression analyzes showed the influence of PsyCap on the mentioned work-related variables. In study 1, 37% of the variance in job satisfaction at T1 and 52% of the variance at T2 was explained by PsyCap. In study 2, 52% of the variance in JS was explained by PsyCap at T1, 60% of the variance in JS was explained by PsyCap at T2, and 56% of the variance in JS was explained by PsyCap at T3. Concerning study 1, almost 50% of the variance in work engagement at T1 and 60% of the variance at T2 was explained by PsyCap. In study 2, 55% of the variance in WE was explained by PsyCap at T1, 70% of the variance in WE was explained by PsyCap at T2, and 72% of the variance in WE is explained by PsyCap at T3. Lastly, no significant results for PsyCap to explain variance in OC were measured in study 1 and in study 2 only 16% of the variance in OC was explained by PsyCap at T2. Other than that, no significant results for PsyCap to explain variance in OC were measured. According to Cohen (1988), there was a strong variance explanation in JS and WE by PsyCap at all measurement points in both studies. This means that PsyCap contributed in a substantial way to the work engagement and job satisfaction of the participants in both studies. These results are consistent with previous research which assessed the relationship between PsyCap and work engagement (Joo et al., 2016) as well as PsyCap and job satisfaction (Abbas et al., 2014; Luthans, Avolio et al., 2007). In addition, there was a medium variance explanation in OC at T2 in study 2. Hence, PsyCap contributed to the organizational commitment of the participants at the second measurement point in study 2 but there was no influence of PsyCap on OC in study 1. The findings are inconsistent with previous research (Jensen & Luthans, 2006). In sum, the overall variance explanation of WE and JS by PsyCap was extremely high in both studies. The influence of PsyCap on the aforementioned work-related variables was higher in study 2 than in study 1 at all measurement points. The results show that it is of the utmost importance to focus on PsyCap development in organizations, as it has a large impact on work-related variables. The proximal outcome

of the two studies focused on improving participants' PsyCap with the four components of hope, self-efficacy, resilience, and optimism. The distal results focused on having a desirable impact on attitudes and behavioral outcomes for the individual and thus the organization. More precisely, the distal results of this thesis focused on work engagement, job satisfaction, and organizational commitment. Overall, the results led to a strong variance explanation in job satisfaction and work engagement by PsyCap.

Post-training evaluation. A comprehensive evaluation of the two PsyCap intervention measures was conducted to gain further insights into the two PsyCap intervention measures. For the evaluation, Kirkpatrick's (1979) well-established model was implemented (see Table 2-4) for an overview of the questions asked). The evaluation of the gamified online training *HERO of the Jungle* addressed two of the four levels of evaluation (i.e., reaction, learning) and the evaluation of the classroom trainings *Personal Resource Development* addressed three of the four levels of evaluation (i.e., reaction, learning, and behavioral change). In study 1, the third level of evaluation was not conducted due to the missing measurement at T3. The fourth level (i.e., results / effects on business by trainee) of evaluation was not measured in both studies due to the strictly confidential data protection treatment of the company data. This somewhat reduced the significance of the study results. The responses from the participants are summarized below.

Overall, the findings of study 1 and 2 indicate that the employee's reactions towards both training formats were positive. The results showed that the majority of the participants from EG 1 and EG 2 would recommend the PsyCap training to a colleague or friend (study 1: 41% of the participants would recommend the gamified online training and 37% of the participants would rather recommend it; study 2: 65% of the participants would recommend the PRD classroom trainings and 27% would rather recommend it). Furthermore, the participants from EG 1 and EG 2 found the theoretical and practical learning activities balanced and the exercises were well suited to teach PsyCap content. In study 1, the PsyCap learning content in the chapter rating was rated very well with an average rating of 4 out of 5 possible stars from all participants (M = 3.80; SD = 1.13). This means that the PsyCap learning content was well received by the participants in the gamified online training. Furthermore, 51% of the participants in study 1 liked the format and design of the HERO training and 18% of the participants rather liked it. Besides, 38% of the participants saw themselves as being able to apply what they had learned to their job and 32% of them rather saw themselves able to apply the learning content. In study 2, 81% of the participants found the trainer (i.e., doctoral candidate) competent and 16% of them found the trainer rather competent. Moreover, 75% of the workshop attendees stated that the trainer delivered the PsyCap learning content in an engaging and knowledgeable way and 19% of them rather agreed. The positive results from the post-training surveys (at T2 and T3) can have a positive impact on employee performance and ultimately on the entire company. PsyCap proponents have communicated a quantifiable return on investment for the Psychological Capital Intervention (PCI) to demonstrate its effectiveness regarding an increased PsyCap and improved work performance (Luthans et al., 2010). Preliminary utility analyzes have estimated a robust return on investment (ROI) in over 200% for a PsyCap training intervention (see Luthans, Youssef, & Avolio, 2007c for detailed quantitative utility analysis). Even though it was not possible to measure the training effects on the business by the trainee

(i.e. 4th level of evaluation by Kirkpatrick (1979)), the company's global revenue has increased by 11% in the last 3 years. In addition, the company is repeatedly ranked as a very good employer in global rankings for its initiatives and is regularly recognized as a top employer. This is reflected in the revenue figures. While those performance measures cannot be attributed to the PsyCap trainings, it is an important indicator of what the company is doing for the mental health and well-being of its employees. As mentioned at the beginning, companies can only remain competitive if they recognize and value their employees as their most valuable resource and develop their skills. Only when the four classes of capital, (i.e. traditional economic capital, human capital, social capital, and positive Psychological Capital are available in an organization, sustainable competitive advantage can be ensured (Luthans, Luthans, & Luthans, 2004).

The comments in the open evaluation questions served as additional feedback on the PsyCap interventions. As hypothesized, the exchange and discussions with the participants in the classroom trainings were perceived positive and very helpful while in the gamified online training, there was only little interaction between the players as there was only one team with three players. Overall, the majority of the participants in EG 1 liked the gamification and the overall concept, but suggest improving the technical set-up and the quiz question. In general, they learned to develop positive psychological capacities and recalled the learning content because they directly applied it in the gamified online training. Reasons for not continuing the PsyCap training were lack of time and technical problems on the platform. Overall, the participants in EG 2 liked the (small) group discussions, the general setup (i.e., compact format, degree of participation, teacher-centered lessons, and personal exercises), and the casual and open atmosphere in the workshop. They suggested improving the setup (i.e., increasing workshop duration, deepening the topic, and reduce number of participants), allocating more time for group discussions, and focusing more on specific tools or methods to improve PsyCap. Overall, they learned how to set and visualize work-related goals, received information about the PsyCap concept, and gained knowledge about coping with adversity (e.g., by managing adverse workplace events). Feedback givers recalled the video clips of the company leader, gained insight into the company leader's personality, and learned how to deal with personal setbacks and overcoming obstacles. In addition, they remembered the practical exercises (e.g., goal setting and visualizing, pathway exercise), as these helped them to reflect on their individual situation, and they remembered the group discussions as the personal exchange was found to be very helpful for them. Overall, the results show, that employees are still familiar with classroom training as this has been a common training method in the past. In particular, the social exchange among employees plays an important role here. Due to the increasing distribution of employees to other regions and countries, web-based trainings offer the possibility to teach a large number of employees simultaneously without physical presence. However, when it comes to group work, participants in web-based trainings face bigger challenges than in face-to-face courses (Smith et al., 2011). Future studies in the field of gamified trainings are encouraged to incorporate team chat functions to strengthen the participants' sense of togetherness.

In addition, the behavioral level evaluation in study 2 was also encouraging since the overall PsyCap mean values showed a positive trend in EG 2 over time (M_{T1} = 4.18; SD_{T1} = .66; M_{T2} = 4.43; SD_{T2} = .70; M_{T3} = 4.50, SD_{T3} = .77). Furthermore, the majority of the feedback providers reported that they had learned '*how to set work-related goals and how to visualize them*' (i.e., hope component of PsyCap), acquired knowledge about the PsyCap concept itself, and how to master difficulty by evaluating adverse events at work (i.e., resilience component of PsyCap). Furthermore, they gained valuable insights by having applied self-reflection throughout the classroom training while also having acquired information on how to deal with goal blockages and pathways to reach their work-related goals (i.e., the hope component of PsyCap). This corresponds exactly to the aspects that the participants were asked to learn in the training (see chapter 4.2.2). By having discussed individual adverse events and challenges at work with colleagues, this led to valued conversations and the feeling of being accepted and being heard increased. In sum, concerning the comments in the open feedback format, the workshop members learned what they should have learned in the PRD training. Nevertheless, there was no targeted learning control in the form of a test. At T3, almost three-fourth of the PRD workshop members agreed that they had applied the learning content in their job and more than every second participants agreed to having experienced a remarkable positive change in their behavior back on the job. The results show that the majority of the participants in study 2 continued to apply the PsyCap training content in the workplace after the training. The positive trend in the PsyCap scores in EG 2 to T3 may be reflected by this.

Effectiveness and acceptance of the PsyCap trainings

While there is plenty of evidence for the effectiveness of PsyCap online trainings (e.g., Luthans et al., 2008) on the one hand and PsyCap classroom trainings (e.g., Luthans et al., 2010; Luthans, Avey et al., 2006) on the other hand, valid empirical comparisons of these formats are rare. Therefore, several aspects concerning the comparison of the effectiveness and acceptance of both PsyCap interventions are discussed next.

First, concerning the differences between the two PsyCap approaches, it was hypothesized that the number of participants in the gamified online training would be greater compared to the classroom trainings. This was not the case. Although there was the opportunity for participants to access the gamified online platform regardless of their work region, work location, and work schedule, a large number of participants, did not complete the training. According to the training evaluation, reasons for not completing the PsyCap training were lack of time and technical difficulties with the gamified online platform.

Second, regarding the comparability of the invitation texts of both studies, the texts contained descriptions of the PsyCap trainings, the target group, and the learning content. Hence, the invitation text for both studies was comparable.

Third, the overall PsyCap content of the two studies was comparable insofar as it addressed the development of the PsyCap elements of hope, self-efficacy, resilience, and optimism. The content for the learn chapters in study 1 was based on the doctoral candidate's own development and the content for the practice chapters (i.e., handouts for self-reflection) was adapted from Luthans et al. (2015). The

content for the PsyCap workshops in study 2 was adopted from Luthans, Avolio, and Avey (2013). In PsyCap interventions (PCIs) studies, the facilitators are usually using a series of writing, discussion, and self-reflective exercises as well as videos related to each of the four personal resources. These types of exercises were all available in the classroom training in study 2. Writing and self-reflection exercises were also available in study 1. However, there was a lack in discussing the exercises with other participants in the gamified online training. Because of the commonalities among the PsyCap resources, the development of one resource results in the other resources being strengthened as well (Luthans & Youssef-Morgan, 2017).

Fourth, the scope of the learning content slightly differed in both studies. In the first study, the exercises (videos, articles, and self-reflection tasks) were more extensive compared to the PsyCap workshops, while the workshop also focused on discussions among participants. Therefore, due to the different training formats, the PsyCap learning content that addressed the different elements of PsyCap is only comparable to a limited extent, because more explanation of the exercises in the gamified online training is needed due to the physical absence of a trainer and the absence of discussions among the participants. As web-based courses are increasingly used, it is important to inspect whether this educational medium is suitable for teaching skills and knowledge (Sitzmann et al., 2006). Hence, caution is warranted when organizations consider implementing web-based instructions because the relative effectiveness of the training may depend on both the intended learning outcomes and the training conditions (Sitzmann et al., 2006).

Fifth, it needs to be taken into account that it was not possible to measure whether the participants in the gamified online training completed the respective tasks and spent time for self-reflection. Users could simply click the ‘Done’ button when they had completed a particular task. It was not known whether they had actually completed the task or not, which significantly limits the effectiveness of study 1. In contrast, it was easier to assess whether the workshop participants had carried out the exercises because the trainer was present on site and could influence this.

Overall, with regard to the acceptance of the two PsyCap interventions, it can be concluded that the classroom trainings were much more accepted than the gamified online training. This is shown on the one hand by the higher number of participants ($N_{EG\ 1}$ = 57; $N_{EG\ 2}$ = 83) and on the other hand by the better results in the post-training evaluation. As mentioned earlier, the results show that the employees are still familiar with classroom trainings, as this has been a common training method in the past. Above all, social exchange among employees in the form of (small) group discussions played an important role in the classroom training. It is therefore worth considering whether it would not make sense to continue offering classroom training in companies in the future and not to replace them completely with (gamified) online trainings even if they offer the possibility of teaching a large number of employees at the same time without being physically present. The next chapter describes several strengths and limitations of the conducted studies.

5.2 Strengths and Limitations of the present Studies

When interpreting the presented results of study 1 and 2, some methodological strengths and limitations have to be taken into account, which are discussed in the following.

Methodological strengths and limitations

A major strength of this dissertation is that studies 1 and 2 are characterized by their high application relevance when conducted in a real work setting. In general, the first PsyCap micro-intervention studies were conducted under strictly controlled conditions (e.g., random assignment to experimental and control groups) with prospective adults (i.e., management students). Later, these brief PsyCap interventions were conducted with managers and employees from different types of professions and organizations (Luthans et al., 2008; Luthans et al., 2010; Luthans, Avey et al., 2006). In particular, the investigations in this thesis focused on employees in the development organization of a multinational software corporation. The samples of the research participants presented in this thesis consisted of three independent samples (EG 1, EG 2, and CG). The sample of the CG included individuals from another organization within the company that belonged to the functional area of development within the company and had the most overlap with the development organization for job roles (i.e., they had similar tasks and job profiles. In study 1, the PsyCap gamified online training was conducted utilizing a sample of employees from a broad spectrum of different development job functions within the entire development organization. In study 2, a sample of employees who worked for the company in different regions in Germany was used in the PsyCap classroom trainings. Both PsyCap interventions required little time (4 hours) and the results of the conducted studies are not only interesting for PsyCap researchers, but also of practical importance for managers and HR professionals.

To add another strength, the data from the online surveys consisted of self-reported data from the participants. An advantage of self-report, survey-based research is that it eliminates the risk of interviewer bias and preserves the anonymity of the participants (Sarantakos, 2013). Since the variables in both studies were subjective in nature, they were therefore best assessed through self-reporting (Spector, 2006). Thus, multi-rater methods would have been not suitable to measure these variables.

Another strength is that all studies were conducted with multiple measurement points and at least one control group (CG). The control group was divided into CG 1 (i.e. participants who completed two measurements) and CG 2 (participants who completed three measurements). For the purpose of comparison, EG 1 was compared with CG 1, while EG 2 was compared with CG 2. Without a control group, a confounding of the intervention effect with the effect of other occurring factors cannot be ruled out and, in the worst case, the effect is incorrectly attributed to the intervention (Hager et al., 2000).

Apart from that, one major limitation of this dissertation is that there was only one control group in both studies. The same control group was used for both studies and therefore, CG 1 and CG 2 were not independent of each other. A second control group would have provided additional clarity in the analyzes. However, a second control group could not be implemented due to the circumstances in the company. No further control group under the same conditions could be formed that would have met the requirements (i.e. overlap with the development organization in terms of job profiles or job roles). For this reason, only one control group was used for the analyzes. Nevertheless, an ideal pre-post follow-

up design with at least two comparison groups is rare in organizational psychological studies (Noe, 2013; Sattler & Sonntag, 2016).

In addition, this dissertation lacks the randomization of the study participants in study 1 and 2 because the participants registered voluntarily for the respective PsyCap training. When individuals are randomly assigned to an experimental condition, all potential confounding variables are expected to have the same distribution across all experimental conditions. However, as mentioned before, in organizational psychological studies, randomization of subjects is rarely possible because entire work groups or teams are usually assigned to specific experimental conditions (Freund & Holling, 2007). Furthermore, experimental study conditions are usually not possible in the context of a company (Sattler & Sonntag, 2016). Thus, the implementation of an ideal pre-post follow-up design with at least two comparison or control groups is rare (Noe, 2013). According to Bortz and Döring (2016), however, numerous quasi-experimental procedures are available to make statements about the effectiveness of training interventions.

Moreover, the sample size of EG 1 and CG 1 (57 participants from each group) in study 1 as well as the sample size of EG 2 (83 participants) and CG 2 (38 participants) in study 2 was quite small. Treatment groups in PsyCap interventions typically consist of 40-190 individuals (see Dawkins et al., 2013 for a comprehensive review), which was the case in both studies. When control groups are present in studies, the number of individuals is typically smaller than in treatment groups (Dello Russo & Stoykova, 2015), which was also the case in study 2. The doctoral candidate tried every possible means to motivate and engage the participants in study 1 by sending out personalized e-mails asking if they needed help or by offering calls in case of any questions about the gamified learning program. The doctoral candidate also tried every possible means to reach more participants for CG 1 and CG 2 by sending reminder e-mails to the participants to complete the online questionnaire at all measurement points. One reason for the low response rate in the control group may be that the individuals were not willing to engage in completing the extensive online questionnaire (68 questions in about 15 minutes) several times. If the survey took too long for the participants to complete, or if they were interrupted (e.g., by a meeting or phone call, etc.), the survey may have been accidentally closed. Participants may have lost patience and abandoned the survey at some point. This is how most of the questionnaire drop-outs may have occurred. Another interpretation suggests that the employees in the organization were "survey-tired" because there are generally many survey inquiries. These conditions were potentially not as prevalent in other studies. Future research should attempt to use larger sample sizes to increase confidence in the results.

Lastly, the missing follow-up measurement at T3 is a clear limitation of study 1. The scope of the online surveys across the three measurement points had to be reduced to two measurement points in study 1. Therefore, the data analyzed in this thesis were not consistently available across three measurement points, but only across two measurement points to compare the two studies, which reduces the interpretability of the study results.

PsyCap training method comparison

To distinguish the two PsyCap training methods, a comparison on the basis of various characteristics between the gamified online training and the classroom training was made (see Table 5-2, based on own development).

Table 5-2

Training Method Comparison between Gamified Online Training and Classroom Training

Characteristics	**Gamified Online Training**	**Classroom Training**	**Description**
1. Brief modular learning content	✓	✓	4-hour training with short 5-20 min segments
2. Multiple feedback channels	✓	✓	Gamified Online Training: Feed, points, badges, leader-board, instant feedback with progression lines Classroom Training: Trainer and other participants
3. Exchange and discussions with participants	x	✓	Small group and group discussions
4. Low-cost intervention	x	✓	Costs for gamified online platform, trainer, materials
5. Presence of trainer and possibility to ask questions	!	✓	
6. Visible, transparent learning progress and completion status	✓	!	
7. Accessibility: Location, time, team, schedule, team (size) independent	✓	x	
8. Learning path chosen autonomously	✓	x	Self-selectable navigation

Legend. ✓ Requirements completely met; ! Requirements partly met; x Requirements not met

First, regarding the learning content segments, there were brief exercise modules for both training approaches ranging from 5-20 minutes such as short video clips, articles, infographics, and practical exercises for self-reflection.

Second, multiple feedback channels were available in both Psycap training approaches which is a strength of the training method. In the gamified online training the points, badges, leaderboard, and the feeds served as feedback on the actions of the participants. In the classroom training the feedback from the trainer and other participants was available throughout the workshop. The feedback in the classroom training was given through different individuals while the feedback in the gamified online training was reported back through the system.

Third, in terms of exchanging and discussing the relevant content with colleagues, this was only possible in the classroom training as there was no team chat function available in the gamified online training. The lack of trainer presence in the gamified online training is a limitation for study 1.

Fourth, as PsyCap interventions are regarded as low-cost interventions, only costs for the trainer, participants' time away from work, and a few training materials need to be calculated. This characteristic is met for the classroom trainings. However, for the gamified online training, it is important to mention that they require far more resources such as developers, IT specialists, communication personnel, and psychologists to prepare and maintain the gamification platform as well as the training content, which is quite cost-intensive. Therefore, such training formats cannot be considered low-cost interventions and careful consideration should be given to whether a (gamified) online training should be implemented.

The fifth comparison of the two learning methods deals with the presence of a trainer and the opportunity to ask questions throughout the course if needed. This was the case in the classroom training which is a major strenghts. This aspect was only partly given in the *HERO of the Jungle* course. There, the individuals had the possibility to reach out to the doctoral candidate if they had questions. However, there was no trainer physically present. Traditionally, however, educators have focused on lecture and discussion teaching methods in which learners are dependent on the trainer and are assumed to have a passive role in the learning activities (Da et al., 2020). It is assumed that all participants are at the same level and learn at the same pace which is not always the case when conducting trainings.

Sixth, the gamified online training contained a visible and transparent learning progress and completion status. The learning progress was tracked by the increasing number of experience points and thus higher levels that the participants received once they had successfully completed a task. The completion status of an animal in the *HERO of the Jungle* training was indicated by connected lines between the individual animals. In this way, the participants could individually see which animals (i.e., the single PsyCap elements) they had already completed. On the other hand, the individual and transparent learning progress and completion status was only partly given in the classroom training. This is due to the fact that the participants of the PRD workshop were in a group setting and sometimes had to wait for the others if they had not yet finished the exercises. This hindered individual progress in the learning process. In contrast, self-learning, which was possible in gamified online training, had some distinct characteristics such as the promotion of the learners' personal autonomy, the realization of self-management, and the control over the learning process (Candy, 1991). Employees who learn quickly through courses, refresher, and other further training initiatives can respond to the company's needs in

a timely manner, both internally and externally (Namada, 2018). Through learning organizations can also react quickly and in a timely manner to changing environments (Namada, 2018).

Seventh, concerning the accessibility of the training, the participants of the gamified online course had the flexibility to learn the content, regardless of their time zone, location, schedule, or team (size) which is a major strength and advantage of (gamified) online training programs and at the same time a major limitation for classroom trainings, because there were fixed training dates. This in turn has the advantage that the participants actually completed the PsyCap classroom training, whereas in the gamified online training, learners could theoretically just pretend to have worked through the content. However, this had not been verified.

The last characteristic in comparing the two distinct learning approaches addresses the learning path. In study 1, the individuals could choose their learning path autonomously by selecting the particular animal (i.e., PsyCap element) they were interested in. This was not applicable in study 2 as the learning path was predetermined which is a limitation for study 2. Web-based course formats enable a greater degree of autonomy and self-determination by allowing participants to learn the content of a course at any time and from any location (Shachar & Neumann, 2003). On the other hand, one study showed that small group learning had significantly more positive effects than individual learning on student individual achievement, group task performance, and various process and affective outcomes (Lou, Abrami, & d'Apollonia, 2001). Moreover, there is a higher comparability of the PsyCap learning content in study 2, since all participants had the same learning path.

To conclude, the results of the present studies provide valuable information showing both strengths and limitations of gamified online and classroom trainings. Every learning method has its advantages and disadvantages and personnel training will never be one-size-fits-all. Learning methods depend on the format adjusted to the employees' preferences as well as the learning content itself. The next chapter provides valuable implications and directions for future PsyCap research and practical use of the study results.

5.3 Implications and Directions for future Research and Practice

The research on PsyCap has developed strongly over the past 15 years. There has been abundant exploration on positive concepts in general as well as on positive interventions and applications in small, medium, and large organizations worldwide encompassing banking, marketing, insurance, healthcare, education, telecommunications, hospitality, manufacturing, military, sports and others (Luthans & Youssef-Morgan, 2017). The development and evaluation of the two resource-oriented PsyCap interventions aimed to link scientific research and practice by building on existing theories and research findings to create two practice-relevant programs that could be compared with each other. In addition, the insights gained from testing and evaluation in turn provide implications for science and practice. Proponents of this resource-based approach are encouraged to further set up PsyCap as a relevant organizational behavior (OB) construct. Since individuals with a high PsyCap show favorable attitudes and behaviors with regard to their work engagement and job satisfaction, managers and HR professionals should encourage employees to participate in PsyCap trainings. Person-centered interventions such as the ones evaluated in this thesis or individual modules (i.e. a certain selection of

PsyCap elements) can be used here. As PsyCap interventions are regarded as low-cost interventions, only costs for the trainer, participants' time away from work, and a few training materials need to be calculated. Therefore, the return on investment for the development of PsyCap appears to be very high (Luthans, Avey et al., 2006; Luthans & Youssef, 2007). Nevertheless, when selecting a PsyCap training format, companies should expand their selection criteria beyond scalability of (gamified) online trainings and cost benefits. Other factors, such as the likelihood that employees will engage with an (gamified) online learning platform, should be considered. If employees do not regularly engage with technology as part of their job, classroom training approaches may be a better fit for the organization. However, the participants in study 1 all had a high affinity for technology. A central question is how participation in (gamified) web-based training can be further enhanced, since drop-out rates a relatively high (Jordan, 2015; Onah, Sinclair, & Boyatt, 2014). Many explanations such as a lack of social exchange, lack of competencies for web-based courses to interact in a meaningful way, lack of motivation or self-confidence, or a lack of organization and structuring of learning activities are discussed (Kop, 2011). To answer the question of how employees can be motivated to voluntarily participate in continuing further training opportunities in addition to their daily workload, some suggestions are proposed next. First, it depends on the learning content itself. If the content is of interest to the learner, the training is more likely to be carried out (Grabe & Stoller, 1997). In addition, research suggests that training programs that include both instructional conditions for conveying knowledge and practical conditions for applying the learned content are most effective in helping participants expand their self-regulated learning skills (Masui & Corte, 2005). Second, when incentives are created and participants receive *something* for successfully completing the training, they are more likely to complete it (Covell et al., 2016). For example, bonus payments can be linked to the completion of certain training courses (i.e., monetary incentives). One example of non-monetary incentives is the possibility of free academic studies upon successful completion of specific (further) trainings. Another example is by making promotions dependent on the successful completion of specific trainings for further education (Carmichael, 1983; Scandura, 1992). Therefore, in future studies it should be examined which activating teaching methods could be used to increase employee motivation. In addition, it would be of great interest to research how PsyCap interventions should be designed to stimulate employee engagement to participate in voluntary PsyCap trainings.

Practical implications relate to augmenting the use of both individual- and team level PsyCap, especially in relation to HRD approaches. Certainly, this has far-reaching implications for key workplace characteristics such as employee engagement, performance feedback, role design, and leadership style. Furthermore, with improved psychometrics and measurement techniques, a more accurate assessment of employees' PsyCap can be ensured. Therefore, managers or HRD professionals will be capable of determining the necessity and benefits of PsyCap interventions for their employees. In addition, positive psychological concepts such as hope, self-efficacy, resilience, and optimism should be given importance not only during the PsyCap development training but also in daily manager-employee interactions. Besides that, PsyCap measurements and profile creation may also offer managers, HR staff, and providers of Employee Assistance Programs (EAP) a more extensive representation of employee positivity and respective psychological resources such as the HERO

components. The consideration of a four-factor model of PsyCap also has important practical implications. Above all, this model allows to determine which PsyCap components are most important with respect to certain target variables in the workplace. Regarding cross-cultural implications, it has to be mentioned that "what is considered positive in one culture may not necessarily be considered positive in another culture" (Luthans & Youssef-Morgan, 2017). Therefore, decisions still need to be made about what type of training is best for different jobs based on what is logistically and culturally likely to be best for each organization (Gayed et al., 2019). Future research on PsyCap intervention studies could therefore address (corporate) cultural differences on the POB construct of PsyCap. In addition, future PsyCap research should include constructs such as a "cultural PsyCap", and even a "virtual PsyCap" to provide meaning and purpose for organizations, given the way we all interact today and into the future (Luthans et al., 2015). Nevertheless, PsyCap development may produce potential side effects in the organization. If the individual values and goals of the employees and the corporate strategy are not compatible, employee motivation and commitment as well as company performance may shrink. Therefore, it is important to integrate positive psychological resources into HRD practices to align to the company's' strategy. To keep employees engaged and committed at work, they also need to realize new tasks from time to time. One initiative might be a job rotation to learn new things and develop themselves further to keep the employees engaged and committed (Ho, Chang, Shih, & Liang, 2009). Especially in a development organization, it is critical to promote such initiatives as the single tasks can be repetitive and not varied. Therefore, it is important for organizations to offer employees development opportunities to keep them with the company. Future PsyCap studies could examine the effects of job rotation programs on the organizational commitment and PsyCap of employees.

Overall, companies considering the introduction of gamification should first weigh up the associated objectives. It is extremely important that companies use gamification elements that fit their goals and corporate culture. According to Schubert, Paulsen, and Hager (2014) the starting situation for gamification projects is not ideal, especially in Germany. Due to the desire for protection of privacy and strict legislation with works councils, the introduction of gamification techniques are allowed only within a specially defined framework (Schubert et al., 2014). However, for practical application in the future, innovative learning experiments on PsyCap could be illustrated with 3D Virtual Reality (VR) applications. Regarding the chances and challenges for the future practice of gamification, studies also show that it is difficult to make gamification elements permanently attractive to employees (Stieglitz, 2017). When getting to know the point scales and badges, they can appear attractive and varied, but after a longer use redundant or even be annoying. Future practice of gamification projects may consider inserting additional measurement features such as login frequency of the players on the platform or the time spent on individual elements (videos, articles or quizzes). Additionally, specific information on which modules have been completed may also be helpful. These user behavior data can help provide additional insights into the effectiveness of such trainings.

With regard to a certain PsyCap method approach, Luthans and Youssef-Morgan (2017) suggest to applying more qualitative and mixed-methods research to be more beneficial than the usual quantitative experiments. In this thesis, quantitative and qualitative survey self-report data at the individual-level of analysis were combined in both studies to obtain a comprehensive picture on the effectiveness of the

PCI. Moreover, future studies and practices could use hybrid learning models such as a combination of remote (i.e., online training/conferencing) and in-office (i.e., physically present participants) approaches for PsyCap interventions. Herewith, individuals take a course both in front of their laptops or screens at home and physically present in the office while interacting with each other. This set-up can easily be used to deliver content, ask questions to individuals, and create small groups in virtual break-out rooms. It would be interesting to investigate in the future how hybrid learning models would affect the effectiveness of PsyCap intervention models. An important contribution from the studies in this thesis comes from the multiple regression analyzes conducted to examine the influence of key work-related variables on PsyCap. Most notable is the influence of PsyCap on work engagement and job satisfaction. Organizations will continue to look for ways to create great workplaces where employees can thrive to achieve important results in the company. Building on the research reviewed and presented in both studies, future researchers are encouraged to strive for these and other interesting questions to better understand the construct of PsyCap, its mechanism of effect, and its impact on work-related variables.

5.4 Conclusion

In an increasingly fast-paced working world, companies can only remain competitive, if they recognize and value their employees as their most valuable resource as well as to put efforts in their further development, abilities, and skills. Building on the groundwork of traditional economic, human, and social capital, researchers have started to focus on Positive Psychological Capital (PsyCap), a second-order core construct, as a source for competitive advantage. Research shows that investing in PsyCap empowers organizations in a variety of ways. Numerous studies have shown that the development of PsyCap can lead to increased work performance and job satisfaction (Abbas et al., 2014), psychological well-being (Avey, Luthans, Smith, & Palmer, 2010), and organizational commitment (Jensen & Luthans, 2006; NGUYEN & NGO, 2020). In addition, empirical research confirms that PsyCap can be developed through brief, highly focused group intervention (Luthans et al., 2008; Luthans et al., 2010; Luthans, Avey et al., 2006) and individual on-line sessions (Luthans et al., 2008). There are different types of PsyCap trainings such as classroom trainings or web-based trainings. However, to date, PsyCap research has not yet empirically examined the combination of PsyCap micro-interventions with gamification elements in a gamified online training. This thesis fills the gap and expands PsyCap research by having included gamification elements into the PsyCap training program. The objective of the present thesis was to implement and analyze two intervention measures (Study 1, the gamified online training *HERO of the Jungle* and study 2, the classroom trainings *Personal Resource Development)* to enhance the PsyCap of employees within the development organization of a multinational software corporation. The learning content comprised theoretical and practical parts for the development of the four respective elements of PsyCap: hope, self-efficacy, resilience, and optimism. Thereby, the scientific findings of PsyCap were transferred to the working context. The research approach consisted of a quantitative and qualitative survey conducted with two experimental and control groups at two (study 1) and three (study 2) measurement points. The experimental group 1 (EG 1) received the intervention measure with the gamified online training, the experimental group 2 (EG 2) underwent the classroom training *Personal Resource Development*, and the control groups 1

and 2 (CG 1, CG 2) received no training but only the online questionnaire. Following the training and the online survey at T2, the participants from the experimental groups were able to provide feedback on the PsyCap intervention measure. This included several closed and open questions.

As a result of this thesis, even if there were no significant differences measured in the statistical analyzes, there was a positive trend in the PsyCap mean vales in both studies over time. Given the high drop-out rates and small sample size, the results in both studies were not significant compared to the control groups. To maximize the completion rate and impact of new gamified online and classroom training programs, it is desirable to develop additional strategies that include improving training retention. For example, by providing incentives to the participants, they are more likely to complete the training (Covell et al., 2016). Furthermore, promoting motivation, social exchange, and technological competencies for web-based courses to interact in meaningful ways with other participants increases training completion rates (Kop, 2011).

It is hoped that larger controlled studies can be established in the future to gain more insights into the mechanism of effect of PsyCap interventions. There is still need for further research to show under which prerequisites PsyCap interventions work in the workplace. To improve individual and organizational performance, organizations should train their employees to be hopeful, self-efficacious, resilient, and optimistic. Especially in times of crisis (e.g., global pandemics), positive psychological resources such as hope, self-efficacy, resilience, and optimism, play an essential role. In view of the current situation in which not only employees are confronted with the demands of working from home due to the coronavirus pandemic, PsyCap resources have greatly increased in importance (Daraba, Wirawan, Salam, & Faisal, 2021; Luthans & Broad, 2020). Instead of being together with other peers or colleagues at work, employees are now staying at home and working self-regulated on tasks in front of their laptops, tablets, or other mobile devices. When working from home, individuals have to remove distractions and bring structure to their day to be innovative and productive. Particularly in home-office settings, talking about personal psychological resources is even more important due to the absence of physical and social interaction. This absence can lead, among other things, to negative emotions and even mental illness (Perese & Wolf, 2005). It is therefore even more important to communicate in virtual meetings about the emotional state, to give each other recognition and to be empathetic.

Altogether, both studies not only emphasize the importance of PsyCap development in the workplace but also offer important insights for organizational psychology practices, especially in terms of the benefits of fostering individual's PsyCap. With the PsyCap interventions in both the gamified online training and the classroom trainings, a process can be set in motion in which each employee can contribute to increasing his or her own PsyCap. In addition, the concrete practical exercises and tasks can be applied not only in the workplace but also in daily life. Furthermore, by acquiring positive psychological skills, employees can maintain a high productivity, be engaged, and satisfied at work as well as stay committed to their organization (Avey et al., 2011), which gives the organization competitive advantage. The promotion of self-efficacy, hope, resilience, and optimism in the workplace cannot only strengthen employees individually but also teams and finally the whole organization by starting a process of a free, open, and responsible interaction between other employees, executives, customers, and individuals.

References

Abbas, M., Raja, U., Darr, W., & Bouckenooghe, D. (2014). Combined Effects of Perceived Politics and Psychological Capital on Job Satisfaction, Turnover Intentions, and Performance. *Journal of management*. 40(7), 1813–1830. https://doi.org/10.1177/0149206312455243

Abt, C. C. (1971). *Ernste Spiele: Lernen durch gespielte Wirklichkeit*. Köln: Kiepenheuer & Witsch.

Achor, S. (2011). *The Happiness Advantage: The Seven Principles of Positive Psychology That Fuel Success and Performance at Work*. New York: Random House.

Achor, S. (2013). *Before Happiness: 5 Actionable Strategies to Create a Positive Path to Success*. New York: Random House.

Adams, V. H., Snyder, C. R., Rand, K. L., King, E. A., Sigmon, D. R., & Pulvers, K. (2003). Hope in the Workplace. In R. A. Giacolone & C. L. Jurkiewicz (Eds.), *Handbook of Workplace Spirituality and Organizational Performance* (pp. 367–377). New York: Sharpe.

Alarcon, G. M., Bowling, N. A., & Khazon, S. (2013). Great expectations: A meta-analytic examination of optimism and hope. *Personality and Individual Differences*. 54(7), 821–827. https://doi.org/10.1016/j.paid.2012.12.004

Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*. 63(1), 1–18. https://doi.org/10.1111/j.2044-8325.1990.tb00506.x

Allport, G. W. (1955). *Becoming: Basic Considerations for a Psychology of Personality*. New Haven: Yale University Press.

Arbaugh, J. B. (2000). Virtual Classroom versus Physical Classroom: An Exploratory Study of Class Discussion Patterns and Student Learning in an Asynchronous Internet-Based MBA Course. *Journal of Management Education*. 24(2), 213–233. https://doi.org/10.1177/105256290002400206

Aspinwall, L. G., & Staudinger, U. M. (2003). *A psychology of human strengths: Fundamental questions and future directions for a positive psychology*: American Psychological Association.

Auhagen, A. E. (2008). *Positive Psychologie: Anleitung zum "besseren" Leben*. Weinheim: Beltz.

Avey, J. B. (2014). The Left Side of Psychological Capital: New Evidence on the Antecedents of PsyCap. *Journal of Leadership & Organizational Studies*. 21(2), 141–149. https://doi.org/10.1177/1548051813515516

Avey, J. B., Luthans, F., & Mhatre, K. H. (2008). A call for longitudinal research in positive organizational behavior. *Journal of Organizational Behavior*. 29(5), 705–711. https://doi.org/10.1002/job.517

Avey, J. B., Luthans, F., Smith, R. M., & Palmer, N. F. (2010). Impact of positive psychological capital on employee well-being over time. *Journal of Occupational Health Psychology*. 15(1), 17–28. https://doi.org/10.1037/a0016998

Avey, J. B., Luthans, F., & Youssef, C. M. (2010). The Additive Value of Positive Psychological Capital in Predicting Work Attitudes and Behaviors. *Journal of management*. 36(2), 430–452. https://doi.org/10.1177/0149206308329961

Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-Analysis of the Impact of Positive Psychological Capital on Employee Attitudes, Behaviors, and Performance. *Human Resource Development Quarterly*. 22(2), 127–152. https://doi.org/10.1002/hrdq.20070

Avey, J. B., Wernsing, T. S., & Luthans, F. (2008). Can Positive Employees Help Positive Organizational Change? Impact of Psychological Capital and Emotions on Relevant Attitudes and Behaviors. *The Journal of Applied Behavioral Science*. 44(1), 48–70. https://doi.org/10.1177/0021886307311470

Babcock-Roberson, M. E., & Strickland, O. J. (2010). The Relationship Between Charismatic Leadership, Work Engagement, and Organizational Citizenship Behaviors. *The Journal of psychology*. 144(3), 313–326. https://doi.org/10.1080/00223981003648336

Bakker, A. B., Gierveld, J. H., & van Rijswijk, K. (2006). Success factors among female school principals in primary teaching: A study on burnout, work engagement, and performance. *Diemen: Right Management Consultants*.

Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioral Change. *Psychological Review*. 84(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. New York: Freeman.

Baron, R. A., Franklin, R. J., & Hmieleski, K. M. (2013). Why Entrepreneurs Often Experience *Low*, Not High, Levels of Stress: The Joint Effects of Selection and Psychological Capital. *Journal of management*. 42(3), 742–768. https://doi.org/10.1177/0149206313495411

Barreto, I. (2010). Dynamic Capabilities: A Review of Past Research and an Agenda for the Future. *Journal of management*. 36(1), 256–280. https://doi.org/10.1177/0149206309350776

Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel psychology*. 44(1), 1–26. https://doi.org/10.1111/j.1744-6570.1991.tb00688.x

Bartle, R. (1996). Hearts, Clubs, Diamonds, Spades: Players Who Suit Muds. *Journal of MUD research*. 1(1), 1–27.

Batalla-Busquets, J. M., & Martínez-Argüelles, M. J. (2014). Determining factors in online training in companies. *The International Journal of Management Education*. 12(2), 68–79. https://doi.org/10.1016/j.ijme.2014.01.002

Batson, C. D. (1994). Why Act for the Public Good? Four Answers. *Personality and Social Psychology Bulletin*. 20(5), 603-310. https://doi.org/10.1177/0146167294205016

Bennis, W. G. (1963). A New Role for the Behavioral Sciences: Effecting Organizational Change. *Administrative Science Quarterly*. 8(2), 125–165. https://doi.org/10.2307/2390897

Bennis, W. G. (1969). *Organization Development: Its Nature, Origins, and Prospects*. Reading, MA: Addison-Wesley.

Ben-Shahar, T. (2007). *Happier: Learn the Secrets to Daily Joy and Lasting Fulfillment*. New York: McGraw-Hill.

Bernard, H. R. (2013). *Social Research Methods: Qualitative and Quantitative Approaches* (2nd ed.). New York: Sage.

Block, J., & Kremen, A. M. (1996). IQ and Ego-Resiliency: Conceptual and Empirical Connections and Separateness. *Journal of Personality and Social Psychology*. 70(2), 349–361. https://doi.org/10.1037/0022-3514.70.2.349

Bortz, J., & Döring, N. (2016). *Forschungsmethoden und Evaluation für Human-und Sozialwissenschaftler* (5th ed.). Heidelberg: Springer.

Brief, A. P., & Motowidlo, S. J. (1986). Prosocial Organizational Behaviors. *Academy of Management Review*. 11(4), 710–725. https://doi.org/10.5465/amr.1986.4283909

Bright, D., Cameron, K. S., & Caza, A. (2006). The Ethos of Virtuousness in Downsized Organizations. *Journal of Business Ethics*. 64, 249–269.

Bryant, F. B., & Cvengros, J. A. (2004). Distinguishing Hope and Optimism: Two Sides of a Coin, or Two Separate Coins? *Journal of Social and Clinical Psychology*. 23(2), 273–302. https://doi.org/10.1521/jscp.23.2.273.31018

Bühner, M. (2011). *Einführung in die Test-und Fragebogenkonstruktion* (2nd ed.). Deutschland GmbH: Pearson.

Burke, L. A., & Hutchins, H. M. (2008). A study of best practices in training transfer and proposed model of transfer. *Human Resource Development Quarterly*. 19(2), 107–128. https://doi.org/10.1002/hrdq.1230

Calderón, A., & Ruiz, M. (2015). A systematic literature review on serious games evaluation: An application to software project management. *Computers & Education*. 87, 396–422. https://doi.org/10.1016/j.compedu.2015.07.011

Cameron, K. (2003). Organizational Virtuousness and Performance. In K. Cameron, J. Dutton, & R. Quinn (Eds.), *Positive Organizational Scholarship: Foundations of a New Discipline* (pp. 48–65). San Francisco: Berret-Koehler Publishers.

Cameron, K., Dutton, J., & Quinn, R. (Eds.) (2003). *Positive Organizational Scholarship: Foundations of a New Discipline*. San Francisco: Berret-Koehler Publishers.

Cameron, K. S., Bright, D., & Caza, A. (2004). Exploring the Relationships between Organizational Virtuousness and Performance. *American Behavioral Scientist*. 47(6), 766–790. https://doi.org/10.1177/0002764203260209

Cameron, K. S., & Caza, A. (2004). Introduction: Contributions to the Discipline of Positive Organizational Scholarship. *American Behavioral Scientist*. 47(6), 731–739. https://doi.org/10.1177/0002764203260207

Cameron, K. S., & Spreitzer, G. M. (Eds.) (2012). *The Oxford Handbook of Positive Organizational Scholarship*. Oxford: Oxford University Press.

Candy, P. C. (1991). *Self-Direction for Lifelong Learning. A Comprehensive Guide to Theory and Practice*. San Francisco: Jossey-Bass Publishers.

Carmichael, L. (1983). Firm-Specific Human Capital and Promotion Ladders. *The Bell Journal of Economics*. 14(1), 251–258. https://doi.org/10.2307/3003551

Carr, A. (2011). *Positive Psychology: The Science of Happiness and Human Strengths* (2nd ed.). London: Brunner-Routledge.

Carver, C. S., & Scheier, M. S. (2002). Optimism. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of Positive Psychology* (pp. 231–243). New York: Oxford University Press.

Castany, L. (2010). The role of size in firms' training: evidence from Spain. *International Journal of Manpower*. 31(5), 563–584. https://doi.org/10.1108/01437721011066362

Cavus, M. F., & Gokcen, A. (2014). Psychological Capital: Definition, Components and Effects. *Journal of Education, Society and Behavioural Science*. 5(3), 244–255. https://doi.org/10.9734/BJESBS/2015/12574

Caza, B. B., & Milton, L. P. (2012). Resilience at work : building capability in the face of adversity. In K. S. Cameron & G. M. Spreitzer (Eds.), *The Oxford handbook of positive organizational scholarship* (pp. 895–908). Oxford: Oxford University Press.

Chaudhuri, S., & Ghosh, R. (2012). Reverse Mentoring: A Social Exchange Tool for Keeping the Boomers Engaged and Millennials Committed. *Human Resource Development Review*. 11(1), 55–76. https://doi.org/10.1177/1534484311417562

Chen, D. J., & Lim, V. K. (2012). Strength in adversity: The influence of psychological capital on job search. *Journal of Organizational Behavior*. 33(6), 811–839. https://doi.org/10.1002/job.1814

Cid, D. T., Martins, M. D. C. F., Dias, M., & Fidelis, A. C. F. (2020). Psychological capital questionnaire (PCQ-24): Preliminary Evidence of Psychometric Validity of the Brazilian Version. *Psico-USF*. 25(1), 63–74. https://doi.org/10.1590/1413-82712020250106

Clapp-Smith, R., Vogelgesang, G. R., & Avey, J. B. (2009). Authentic Leadership and Positive Psychological Capital: The Mediating Role of Trust at the Group Level of Analysis. *Journal of Leadership & Organizational Studies*. 15(3), 227–240. https://doi.org/10.1177/1548051808326596

Codish, D., & Ravid, G. (2017). Gender Moderation in Gamification: Does One Size Fit All? In T. Bui (Ed.), *Hawaii International Conference on System Sciences (HICSS)* (pp. 2006–2015). https://doi.org/10.24251/HICSS.2017.244

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Coleman, J. S. (1988). Social Capital in the Creation of Human Capital. *The American Journal of Sociology*. 94, 95–120.

Compton, W. C., & Hoffman, E. (2019). *Positive Psychology: The Science of Happiness and Flourishing* (3rd ed.). Los Angeles, CA: Sage Publications.

Cook, C., Heath, F., & Thompson, R. L. (2000). A Meta-Analysis of Response Rates in Web-or Internet-Based Survey. *Educational and Psychological Measurement*. 60(6), 821–836. https://doi.org/10.1177/00131640021970934

Coutu, D. L. (2002). How Resilience Works. *Harvard Business Review*. 80(5), 46–56.

Covell, N. H., Margolies, P. J., Myers, R. W., Sederer, L., Ruderman, D., Bramer, J. V., . . . Dixon, L. B. (2016). Using incentives for training participation. *Psychiatric Rehabilitation Journal*. 39(1), 81–83. https://doi.org/10.1037/prj0000165

Crawford, C. (1984). *The Art of Computer Game Design*. Berkeley, CA: McGraw-Hill.

Culbertson, S. S., Fullagar, C. J., & Mills, M. J. (2010). Feeling good and doing great: The relationship between psychological capital and well-being. *Journal of Occupational Health Psychology*. 15(4), 421–433. https://doi.org/10.1037/a0020720

Da, S., He, Y., & Zhang, X. (2020). Effectiveness of Psychological Capital Intervention and Its Influence on Work-Related Attitudes: Daily Online Self-Learning Method and Randomized Controlled Trial Design. *International Journal of Environmental Research and Public Health*. 17(23), 8754. https://doi.org/10.3390/ijerph17238754

Dale, S. (2014). Gamification: Making work fun, or making fun of work? *Business information review*. 31(2), 82–90. https://doi.org/10.1177/0266382114538350

Daraba, D., Wirawan, H., Salam, R., & Faisal, M. (2021). Working from home during the corona pandemic: Investigating the role of authentic leadership, psychological capital, and gender on employee performance. *Cogent Business & Management*. 8(1), 1885573. https://doi.org/10.1080/23311975.2021.1885573

David, S. A., Boniwell, I., & Ayers, A. C. (2013). *The Oxford Handbook of Happiness*. New York: Oxford University Press.

Davis, G. F., & Marquis, C. (2005). Prospects for organization theory in the early twenty-first century: Institutional fields and mechanism. *Organization Science*. 16(4), 332–343.

Dawkins, S., & Martin, A. (2010). Is it All Positive? A Critical Analysis of the Current State of Psychological Capital Research. In *Proceedings of the 24th ANZAM Conference* (pp. 1–22). Adelaide EJ: Refereed Conference Paper.

Dawkins, S., Martin, A., Scott, J., & Sanderson, K. (2013). Building on the positives: A psychometric review and critical analysis of the construct of Psychological Capital. *Journal of Occupational and Organizational Psychology*. 86(3), 348–370. https://doi.org/10.1111/joop.12007

Day, A., Kelloway, E. K., & Hurrell Jr., J. J. (Eds.) (2014). *Workplace well-being: How to build psychologically healthy workplaces*. Oxford, UK: John Wiley & Sons.

De Caroli, M. E., & Sagone, E. (2014). Generalized Self-efficacy and Well-being in Adolescents with High vs. Low Scholastic Self-efficacy. *Procedia - Social and Behavioral Sciences*. 141, 867–874. https://doi.org/10.1016/j.sbspro.2014.05.152

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A Meta-Analytic Review of Experiments Examining the Effect of Extrinsic Rewards on Intrinsic Motivation. *Psychological bulletin*. 125(6), 627–668. https://doi.org/10.1037/0033-2909.125.6.627

Dello Russo, S., & Stoykova, P. (2015). Psychological Capital Intervention (PCI): A Replication and Extension. *Human Resource Development Quarterly*. 26(3), 329–347. https://doi.org/10.1002/hrdq.21212

Demerouti, E., Bakker, A. B., de Jonge, J., Janssen, P. P., & Schaufeli, W. B. (2001). Burnout and engagement at work as a function of demands and control. *Scandinavian journal of work, environment & health*. 27(4), 279–286. https://doi.org/10.5271/sjweh.615

Demerouti, E., van Eeuwijk, E., Snelder, M., & Wild, U. (2011). Assessing the effects of a "personal effectiveness" training on psychological capital, assertiveness and self-awareness using self-other agreement. *Career Development International*. 16(1), 60-81. https://doi.org/10.1108/13620431111107810

Deniz, N., Ertosun, O. Z., Erdil, O., & Lutfihak, A. (2015). Positive Psychological Capital Development: A Field Study by the Solomon Four Group Design. *International Business Research*. 8(10), 102–111.

Denning, S. (2019). Lessons learned from mapping successful and unsuccessful Agile transformation journeys. *Strategy & Leadership*. 47(4), 3–11. https://doi.org/10.1108/SL-04-2019-0052

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). Gamification: Toward a definition. In *2011 Annual Conference on Human Factors in Computing Systems (CHI'11)* (pp. 12–15).

Diener, E., & Biswas-Diener, R. (2008). *Happiness: Unlocking the Mysteries of Psychological Wealth*. Malden, MA: Blackwell.

Donaldson, S. I., & Ko, I. (2010). Positive organizational psychology, behavior, and scholarship: A review of the emerging literature and evidence base. *The Journal of Positive Psychology*. 5(3), 177–191. https://doi.org/10.1080/17439761003790930

Dormann, C., & Zapf, D. (2001). Job satisfaction: A meta-analysis of stabilities. *Journal of Organizational Behavior*. 22(5), 483–504. https://doi.org/10.1002/job.98

Dresse, M. (2016). Gamification ist kein Spiel und ein Serious Game kein Prozess. Retrieved from https://www.result.de/gamification-ist-kein-spiel-und-ein-serious-game-kein-prozess/

Eickhoff, C., Harris, C. G., Vries, A. P. de, & Srinivasan, P. (2012). Quality through Flow and Immersion: Gamifying Crowdsourced Relevance Assessments. In *Proceedings of the 35th international ACM SIGIR conference on Research and development in information retrieval* (pp. 871–880). New York, NY. https://doi.org/10.1145/2348283.2348400

Feldman, D. B., & Snyder, C. R. (2000). The State Hope Scale. In J. Maltby, C. A. Lewis, & A. Hill (Eds.), *A Handbook of Psychological Tests* (pp. 240–245). Lampeter, Wales, UK: Edwin Mellen Press.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Los Angeles, CA: Sage Publications.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American psychologist*. 56(3), 218–226. https://doi.org/10.1037/0003-066X.56.3.218

Fredrickson, B. L. (2009). *Positivity*. New York: Crown.

Fredrickson, B. L. (2013). *Love 2.0*. New York, NY: Hudson.

Fredrickson, B. L., & Losada, M. F. (2005). Positive Affect and the Complex Dynamics of Human Flourishing. *American psychologist*. 60(7), 678–686. https://doi.org/10.1037/0003-066X.60.7.678

Freund, P. A., & Holling, H. (2007). Strategien der Versuchsplanung. In H. Schuler & K. Sonntag (Eds.), *Handbuch der Arbeits-und Organisationspsychologie* (pp. 77–89). Hogrefe.

Gable, S. L., & Haidt, J. (2005). What (and Why) is Positive Psychology? *Review of general psychology*. 9(2), 103–110. https://doi.org/10.1037/1089-2680.9.2.103

Gallagher, M. W., & Lopez, S. J. (2009). Positive expectancies and mental health: Identifying the unique contributions of hope and optimism. *The Journal of Positive Psychology*. 4(6), 548–556. https://doi.org/10.1080/17439760903157166

Gåsland, M. M. (2011). *Game mechanic based e-learning: A case study (Master's thesis)*, Norwegian University of Science and Technology. Trondheim, Norway.

Gayed, A., Tan, L., LaMontagne, A. D., Milner, A., Deady, M., Milligan-Saville, J. S., . . . Harvey, S. B. (2019). A Comparison of Face-to-Face and Online Training in improving Managers' Confidence to support the mental Health of Workers. *Internet interventions*. 18, 1–6. https://doi.org/10.1016/j.invent.2019.100258

Ghoshal, S. (2005). Bad Management Theories Are Destroying Good Management Practices. *Academy of Management Learning & Education*. 4(1), 75–91. https://doi.org/10.5465/amle.2005.16132558

Gil, B., Cantador, I., & Marczewski, A. (2015). Validating Gamification Mechanics and Player Types in an E-learning Environment. In Conole G., Klobučar T., Rensing C., Konert J., & Lavoué E. (Eds.), *Design for Teaching and Learning in a Networked World: 10th European Conference on Technology Enhanced Learning, EC-TEL 2015 Toledo, Spain, September 15-18, 2012, Proceedings* (Vol. 9307, pp. 568–572). Heidelberg: Springer.

Gist, M. E. (1987). Self-efficacy: Implications for organizational behavior and human resource management. *Academy of Management Review*. 12(3), 472–485. https://doi.org/10.5465/amr.1987.4306562

Gnauk, B., Dannecker, L., & Hahmann, M. (2012). Leveraging gamification in demand dispatch systems. In *Proceedings of the 2012 Joint EDBT/ICDT workshops* (pp. 103–110).

Grabe, W., & Stoller, F. L. (1997). Content-based instruction: Research foundations. In M. A. Snow & D. M. Brinton (Eds.), *The Content-Based Classroom: New Perspectives on Integrating Language and Content* (2nd ed., pp. 5–21). Michigan Teacher Training.

Hackman, J. R. (2009). The perils of positivity. *Journal of Organizational Behavior*. 30(2), 309–319. https://doi.org/10.1002/job.587

Hackman, M. Z., & Walker, K. B. (1990). Instructional communication in the televised classroom: The effects of system design and teacher immediacy on student learning and satisfaction. *Communication Education*. 39(3), 196–206. https://doi.org/10.1080/03634529009378802

Hager, W., Patry, J.-L., & Brezing, H. (2000). *Evaluation psychologischer Interventionsmaßnahmen: Standards und Kriterien: Ein Handbuch*. Bern: Hans Huber.

Hamari, J., & Keronen, L. (2017). Why do people play games? A meta-analysis. *International Journal of Information Management*. 37(3), 125–141. https://doi.org/10.1016/j.ijinfomgt.2017.01.006

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work? A Literature Review of Empirical Studies on Gamification. *2014 47th Hawaii International Conference on System Science (HICSS)*, 3025-3034. https://doi.org/10.1109/HICSS.2014.377

Harms, P. D., & Luthans, F. (2012). Measuring implicit psychological constructs in organizational behavior: An example using psychological capital. *Journal of Organizational Behavior*. 33(4), 589–594. https://doi.org/10.1002/job.1785

Harris, G. E., & Cameron, J. E. (2005). Multiple Dimensions of Organizational Identification and Commitment as Predictors of Turnover Intentions and Psychological Well-Being. *Canadian Journal of Behavioural Science*. 37(3), 159–169. https://doi.org/10.1037/h0087253

Harter, J. K., Schmidt, F. L., & Hayes, T. L. (2002). Business-Unit-Level Relationship Between Employee Satisfaction, Employee Engagement, and Business Outcomes: A meta-Analysis. *Journal of applied psychology*. 87(2), 268–279. https://doi.org/10.1037//0021-9010.87.2.268

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*. 24(10), 997–1010. https://doi.org/10.1002/smj.332

Ho, W. H., Chang, C. S., Shih, Y. L., & Liang, R. D. (2009). Effects of job rotation and role stress among nurses on job satisfaction and organizational commitment. *BMC health services research*. 9(1), 1–10. https://doi.org/10.1186/1472-6963-9-8

Hobday, M. (1998). Product complexity, innovation and industrial organisation. *Research policy*. 26(6), 689–710. https://doi.org/10.1016/S0048-7333(97)00044-9

Hobfoll, S. E. (2002). Social and Psychological Resources and Adaptation. *Review of general psychology*. 6(4), 307–324. https://doi.org/10.1037/1089-2680.6.4.307

Holm-Hadulla, R. M. (2020). Creativity and positive psychology in psychotherapy. *International Review of Psychiatry*. 32(7-8), 616–624. https://doi.org/10.1080/09540261.2020.1809355

Howard, G. S. (1980). Response-Shift Bias: A Problem in Evaluating Interventions with Pre/Post Self-Reports. *Evaluation Review*. 4(1), 93–106. https://doi.org/10.1177/0193841X8000400105

Huang, L., & Luthans, F. (2014). Toward Better Understanding of the Learning Goal Orientation–Creativity Relationship: The Role of Positive Psychological Capital. *Applied Psychology*. 64(2), 444–472. https://doi.org/10.1111/apps.12028

Huotari, K., & Hamari, J. (2012). Defining gamification: a service marketing perspective. *Proceeding of the 16th international academic MindTrek conference*, 17–22. https://doi.org/10.1145/2393132.2393137

Huotari, K., & Hamari, J. (2017). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic Markets*. 27(1), 21–31. https://doi.org/10.1007/s12525-015-0212-z

Ilies, R., Scott, B. A., & Judge, T. A. (2006). The Interactive Effects of Personal Traits and Experienced States on Intraindividual Patterns of Citizenship Behavior. *Academy of Management Journal*. 49(3), 561–575. https://doi.org/10.5465/amj.2006.21794672

Jensen, S. M., & Luthans, F. (2006). Relationship between Entrepreneurs' Psychological Capital and Their Authentic Leadership. *Journal of Managerial Issues*. 18(2), 254–273.

Joo, B. K., Lim, D. H., & Kim, S. (2016). Enhancing work engagement: The roles of psychological capital, authentic leadership, and work empowerment. *Leadership & Organization Development Journal*. 37(8), 1117–1134. https://doi.org/10.1108/LODJ-01-2015-0005

Jordan, K. (2015). MOOC Completion Rates. Retrieved from http://www.katyjordan.com/MOOCproject.html

Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluation traits – self-esteem, generalized self-efficacy, locus of control, and emotional stability - with job satisfaction and performance: A meta-analysis. *Journal of applied psychology*. 86(1), 80–92. https://doi.org/10.1037//0021-9010.86.1.80

Juul, J. The Game, the Player, the World: Looking for a Heart of Gameness. In *Level Up: Digital Games Research Conference Proceedings* (pp. 30–45).

Kallus, K. W. (2016). *Erstellung von Fragebogen* (2nd ed.). Wien, Österreich: Facultas.

Kanter, R. M. (2004). *Confidence*. New York: Crown Business.

Karatepe, O. M., & Karadas, G. (2014). The effect of psychological capital on conflicts in the work–family interface, turnover and absence intentions. *International Journal of Hospitality Management*. 43, 132–143. https://doi.org/10.1016/j.ijhm.2014.09.005

Keyes, C., & Haidt, J. (2002). *Flourishing: Positive Psychology and the Life Well-Lived*. Washington D.C.: American Psychological Association.

Kinley, N., & Ben-Hur, S. (2015). *Changing Employee Behavior: A Practical Guide for Managers*. New York: Palgrave Macmillan.

Kirkpatrick, D. L. (1979). Techniques for evaluating training programs. *Training and development journal*. 33(6), 78–92.

Kohavi, R., Crook, T., Longbotham, R., Frasca, B., Henne, R., Lavista Ferres, J., & Melamed, T. (2009). Online Experiementation at Microsoft. Proceeding of the third international workshop data mining case studies, 1–16.

Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. *International Review of Research in Open and Distributed Learning*. 12(3), 19–38.

Kubinger, K. D. (2003). Gütekriterien. In K. D. Kubinger & R. S. Jäger (Eds.), *Schlüsselbegriffe der Psychologischen Diagnostik* (pp. 195–204). Weinheim: Beltz PVU.

Kubinger, K. D. (2019). *Psychologische Diagnostik. Theorie und Praxis psychologischen Diagnostizierens* (3rd ed.). Göttingen: Hogrefe.

Lance, C. E., & Vandenberg, R. J. (2009). *Statistical and Methodological Myths and Urban Legends: Doctrine, Verity and Fable in the Organizational and Social Sciences*. New York: Taylor & Francis.

LaRose, R., & Whitten, P. (2000). Re-thinking instructional immediacy for web courses: A social cognitive exploration. *Communication Education*. 49(4), 320–338. https://doi.org/10.1080/03634520009379221

Larson, M., & Luthans, F. (2006a). Potential Added Value of Psychological Capital in Predicting Work Attitudes. *Journal of Leadership & Organizational Studies*. 13(2), 75–92. https://doi.org/10.1177/10717919070130020601

Larson, M., & Luthans, F. (2006b). Potential added value of psychological capital in predicting work attitudes. *Journal of Leadership & Organizational Studies*. 13 (2), 75–92.

Law, F. M., & Guo, G. J. (2016). Correlation of Hope and Self-Efficacy With Job Satisfaction, Job Stress, and Organizational Commitment for Correctional Officers in the Taiwan Prison System. *International journal of offender therapy and comparative criminology*. 60(11), 1257–1277. https://doi.org/10.1177/0306624X15574997

Leary, M. R. (2008). *Introduction to behavioral research methods*. Boston: Pearson Education.

Leitner, S. (2018, February 16). Flashcards about Psychological Capital. Retrieved from https://www.cram.com/search?query=psychological+capital

Li, W., Grossman, T., & Fitzmaurice, G. (2012). GamiCAD: a gamified tutorial system for first time autocad users. In *Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology* (pp. 103–112). https://doi.org/10.1145/2380116.2380131

Linley, P. A., Harrington, S., & Garcea, N. (2010). *Oxford Handbook of Positive Psychology and Work*. Oxford: Oxford University Press.

Linley, P. A., & Joseph, S. (2004). *Positive Psychology in Practice*. Hoboken, NJ: Wiley.

Little, L. M., Gooty, J., & Nelson, D. L. (2007). Positive Psychological Capital: Has Positivity clouded Measurement Rigor? In D. L. Nelson & C. L. Cooper (Eds.), *Positiv Organizational Behavior: Accentuating the Positive at Work* (pp. 191–209). London: Sage.

Lizar, A. A., Mangundjaya, W. L., & Rachmawan, A. (2015). The Role of Psychological Capital and Psychological Empowerment on Individual Readiness for Change. *The Journal of Developing Areas*. 49 (5), 343–352.

Locke, E. A. (1976). The Nature and Causes of Job Satisfaction. In M. D. Dunnette (Ed.), *Handbook of Industrial and Organizational Psychology* (pp. 72–81). Chicago: Rand McNally.

Lopez, S. (2013). *Making Hope Happen: Create the Future You Want for Yourself and Oothers*. New York: Atria.

Lopez, S. J., & Snyder, C. R. (2003). *Positive Psychological Assessment: A Handbook of Models and Measures*. Washington D.C.: American Psychological Association.

Lou, Y., Abrami, P. C., & d'Apollonia, S. (2001). Small Group and Individual Learning with Technology: A Meta-Analysis. *Review of educational research*. 71(3), 449–521. https://doi.org/10.3102/00346543071003449

Luthans, B. C., Luthans, K. W., & Avey, J. B. (2014). Building the Leaders of Tomorrow: The Development of Academic Psychological Capital. *Journal of Leadership & Organizational Studies*. 21(2), 191–200. https://doi.org/10.1177/1548051813517003

Luthans, F. (1998). *Organizational Behavior* (8th ed). Boston: Irwin McGraw-Hill.

Luthans, F. (2002a). Positive organizational behavior: Developing and managing psychological strengths. *The Academy of Management Executive*. 16(1), 57–72. https://doi.org/10.5465/ame.2002.6640181

Luthans, F. (2002b). The need for and meaning of positive organizational behavior. *Journal of Organizational Behavior*. 23(6), 695–706. https://doi.org/10.1002/job.165

Luthans, F. (2012). Psychological Capital: Implications for HDR, Retrospective Analysis, and Future Directions. *Human Resource Management Quarterly*. 23(1), 1–18. https://doi.org/10.1002/hrdq.21119

Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Toward a micro-intervention. *Journal of Organizational Behavior*. 27(3), 387–393. https://doi.org/10.1002/job.373

Luthans, F., Avey, J. B., Avolio, B. J., & Peterson, S. J. (2010). The development and resulting performance impact of positive psychological capital. *Human Resource Development Quarterly*. 21(1), 41–67. https://doi.org/10.1002/hrdq.20034

Luthans, F., Avey, J. B., & Patera, J. L. (2008). Experimental Analysis of a Web-Based Training Intervention to Develop Positive Psychological Capital. *Academy of Management Learning & Education*. 7(2), 209–221. https://doi.org/10.5465/amle.2008.32712618

Luthans, F., & Avolio, B. J. (2009). The "point" of positive organizational behavior. *Journal of Organizational Behavior*. 30(2), 291–307. https://doi.org/10.1002/job.589

Luthans, F., Avolio, B. J., & Avey, J. B. (2013). *Trainer's Guide for Developing Psychological Capital*. Mind garden.

Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive Psychological Capital: Measurement and Relationship with Performance and Satisfaction. *Personnel psychology*. 60(3), 541–572. https://doi.org/10.1111/j.1744-6570.2007.00083.x

Luthans, F., Avolio, B. J., Walumbwa, F., & Li, W. (2005). The Psychological Capital of Chinese Workers: Exploring the Relationship with Performance. *Management and Organizational Review*. 1(2), 249–271. https://doi.org/10.1111/j.1740-8784.2005.00011.x

Luthans, F., & Broad, J. D. (2020). Positive psychological capital to help combat the mental health fallout from the pandemic and VUCA Environment. *Organizational dynamics*, 100817. https://doi.org/10.1016/j.orgdyn.2020.100817

Luthans, F., Luthans, K. W., & Luthans, B. C. (2004). Positive psychological capital: Beyond human and social capital. *Business Horizons*. 47(1), 45–50. https://doi.org/10.1016/j.bushor.2003.11.007

Luthans, F., van Wyk, R., & Walumbwa, F. O. (2004). Recognition and development of hope for South African organizational leaders. *Leadership and Organization Development Journal*. 25(6), 512–527. https://doi.org/10.1108/01437730410556752

Luthans, F., Vogelgesang, G. R., & Lester, P. B. (2006). Developing the Psychological Capital of Resiliency. *Human Resource Development Review*. 5(1), 25–44. https://doi.org/10.1177/1534484305285335

Luthans, F., & Youssef, C. M. (2007). Emerging Positive Organizational Behavior. *Journal of management*. 33(3), 321–349. https://doi.org/10.1177/0149206307300814

Luthans, F., Youssef, C., & Avolio, B. J. (2007a). Psychologial Capital: Investing and Developing Positive Organizational Behavior. In C. L. Cooper & D. Nelson (Eds.), *Positive Organizational Behavior: Accentuating the Positive at Work* (pp. 9–24). London: Sage Publications.

Luthans, F., Youssef, C. M., & Avolio, B. J. (2007b). *Psychological Capital*. New York: Oxford University Press.

Luthans, F., Youssef, C. M., & Avolio, B. J. (Eds.) (2007c). *Psychological Capital: Developing the Human Competitive Edge*. Oxford: Oxford University Press.

Luthans, F., Youssef, C. M., & Avolio, B. J. (2015). *Psychological capital and beyond*. New York: Oxford University Press.

Luthans, F., Youssef, C. M., & Rawski, S. L. (2011). A Tale of Two Paradigms: The impact of Psychological Capital and Reinforcing Feedback on Problem Solving and Innovation. *Journal of Organizational Behavior Management*. 31(4), 333–350. https://doi.org/10.1080/01608061.2011.619421

Luthans, F., Youssef, C. M., Sweetman, D. S., & Harms, P. D. (2013). Meeting the Leadership Challenge of Employee Well-Being Through Relationship PsyCap and Health PsyCap. *Journal of Leadership & Organizational Studies*. 20(1), 118–133. https://doi.org/10.1177/1548051812465893

Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological Capital: An Evidence-Based Positive Approach. *Annual Review of Organizational Psychology and Organizational Behavior*. 4, 17.1-17.28. https://doi.org/10.1146/annurev-orgpsych-032516-113324

Lyubomirsky, S. (2007). *The How of Happiness: A New Approach to Getting the Life You Want*. New York: Penguin.

Lyubomirsky, S. (2013). *The Myths of Happiness: What Should Make You Happy, but Doesn't, What Shouldn't Make You Happy, but Does*. New York: Penguin.

Maddux, J. E. (2009). Self-Efficacy: The Power of Believing You Can. In S. Lopez & C. R. Snyder (Eds.), *Oxford Handbook of Positive Psychology* (2nd ed., pp. 335–344). New York: Oxford University Press.

Magaletta, P. R., & Oliver, J. M. (1999). The hope construct, will, and ways: Their relations with self-efficacy, optimism, and general well-being. *Journal of Clinical Psychology*. 55(5), 539–551. https://doi.org/10.1002/(SICI)1097-4679(199905)55:5<539::AID-JCLP2>3.0.CO;2-G

Malik, P., & Garg, P. (2020). Learning organization and work engagement: The mediating role of employee resilience. *The International Journal of Human Resource Management*. 31(8), 1071–1094. https://doi.org/10.1080/09585192.2017.1396549

Marczewski, A. (2013). Game Mechanics in Gamification: Gamified UK. Retrieved from https://www.gamified.uk/2013/01/14/game-mechanics-in-gamification/

Maslow, A. (1965). *Eupsychian Management*. Homewood, IL: Irwin-Dorsey.

Maslow, A. (1968). *Toward a Psychology of Being*. New York: Van Nostrand.

Masten, A. S. (2001). Ordinary magic: Resilience process in development. *American psychologist*. 56(3), 227–238. https://doi.org/10.1037/0003-066X.56.3.227

Masten, A. S., Cutuli, J. J., Herbers, J. E., & Gabrielle-Reed, M. J. (2009). Resilience in development. In C. R. Snyder & S. J. Lopez (Eds.), *The Handbook of Positive Psychology* (117-131). New York: Oxford University Press.

Masten, A. S., & Reed, M.-G. J. (2002). Resilience in Development. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of Positive Psychology* (pp. 74–88). New York: Oxford University Press.

Masui, C., & Corte, E. de (2005). Learning to reflect and to attribute constructively as basic components of self-regulated learning. *British Journal of Educational Psychology*. 75(3), 351–372. https://doi.org/10.1348/000709905X25030

Mathe, K., Scott-Halsell, S., Kim, S., & Krawczyk, M. (2017). Psychological Capital in the Quick Service Restaurant Industry: A study of Unit-Level Performance. *Journal of Hospitality & Tourism Research*. 41(7), 823–845. https://doi.org/10.1177/1096348014550923

Matsui, T., & Onglatco, M. L. (1992). Career self-efficacy of the relation between occupational stress and strain. *Journal of Vocational Behavior*. 41(1), 79–88. https://doi.org/10.1016/0001-8791(92)90040-7

McDaniel, R., Lindgren, R., & Friskics, J. Using Badges for Shaping Interactions in Online Learning Environments. In *IEEE International Professional Communication Conference* (pp. 1–4).

McGonigal, J. P. (2015). *SuperBetter: A Revolutionary Approach to Getting Stronger, Happier, Braver and More Resilient*. London: Penguin Press.

Meichenbaum, D. (1975). Enhancing Creativity by Modifying What Subjects Say to Themselves. *American Educational Research Journal*. 12(2), 129–145. https://doi.org/10.3102/00028312012002129

Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of applied psychology*. 78(4), 538–551. https://doi.org/10.1037/0021-9010.78.4.538

Montgomery, A. J., Peeters, M. C. W., Schaufeli, W. B., & Ouden, M. D. (2003). Work-home interference among newspaper managers: Its relationship with burnout and engagement. *Anxiety, Stress & Coping*. 16(2), 195–211. https://doi.org/10.1080/10615806.2003.10382973

Morgan, R. B., & Casper, W. J. (2000). Examining the factor structure of participant reactions to training: A multidimensional approach. *Human Resource Development Quarterly*. 11(3), 301–317. https://doi.org/10.1002/1532-1096(200023)11:3<301::AID-HRDQ7>3.0.CO;2-P

Namada, J. (2018). Organizational Learning and Competitive Advantage. In A. Malheiro, F. Ribeiro, G. L. Jamil, Rascao, J. P., & O. Mealha (Eds.), *Handbook of Research on Knowledge Management for Contemporary Business Environments* (pp. 86–104). Hershey, PA: IGI Global.

Newman, A., Ucbasaran, D., Zhu, F. E. I., & Hirst, G. (2014). Psychological capital: A review and synthesis. *Journal of Organizational Behavior*. 35(S1), 120–138. https://doi.org/10.1002/job.1916

NGUYEN, H. M., & NGO, T. T. (2020). Psychological capital, organizational commitment and job performance: A case in Vietnam. *The Journal of Asian Finance, Economics and Business*. 7(5), 269–278. https://doi.org/10.13106/jafeb.2020.vol7.no5.269

Noe, R. A. (2013). *Employee Training and Development*. New York: McGraw-Hill.

Norman, S. M., Avey, J. B., Nimnicht, J. L., & Graber Pigeon, N. (2010). The Interactive Effects of Psychological Capital and Organizational Identity on Employee Organizational Citizenship and

Deviance Behaviors. *Journal of Leadership & Organizational Studies*. 17(4), 380–391. https://doi.org/10.1177/1548051809353764

Norman, S. M., Avolio, B. J., & Luthans, F. (2010). The impact of positivity and transparency on trust in leaders and their perceived effectiveness. *The Leadership Quarterly*. 21(3), 350–364. https://doi.org/10.1016/j.leaqua.2010.03.002

Ohr, D. (2010). Lineare Regression: Modellannahmen und Regressionsdiagnostik. In Wolf C. & Best H. (Eds.), *Handbuch der sozialwissenschaftlichen Datenanalyse* (pp. 639–675). Wiesbaden: Springer.

Onah, D. F., Sinclair, J., & Boyatt, R. (2014). Dropout rates of massive open online courses: behavioural patterns. In *EDULEARN14 proceedings* (pp. 5825–5834).

Organ, D. W. (1988). *Organizational citizenship behavior: The good soldier syndrome.* Lexington, MA: Lexington Books.

Othman, N., & Nasurdin, A. M. (2011). Work Engagement of Malaysian Nurses: Exploring the Impact of Hope and Resilience. *International Journal of Economics and Management Engineering*. 5(12), 1990–1994. https://doi.org/10.5281/zenodo.1334395

Paillé, P., Bourdeau, L., & Galois, I. (2010). Support, trust, satisfaction, intent to leave and citizenship at organizational level: A social exchange approach. *International Journal of Organizational Analysis.* Advance online publication. https://doi.org/10.1108/19348831011033203

Parker, S. K. (1998). Enhancing role breadth self-efficacy: The roles of job enrichment and other organizational interventions. *Journal of applied psychology*. 83(6), 835–852. https://doi.org/10.1037/0021-9010.83.6.835

Parks, A. C., Williams, A. L., Tugade, M. M., Hokes, K. E., Honomichl, R. D., & Zilca, R. D. (2018). Testing a scalable web and smartphone based intervention to improve depression, anxiety, and resilience: A randomized controlled trial. *International Journal of Wellbeing*. 8(2), 22–67. https://doi.org/10.5502/ijw.v8i2.745

Pedro, L. Z., Lopes, A. M., Prates, B. G., Vassileva, J., & Isotani, S. (2015). Does gamification work for boys and girls? An exploratory study with a virtual learning environment. In *Proceedings of the 30th annual ACM symposium on applied computing* (pp. 214–219). https://doi.org/10.1145/2695664.2695752

Perese, E. F., & Wolf, M. (2005). COMBATING LONELINESS AMONG PERSONS WITH SEVERE MENTAL ILLNESS: SOCIAL NETWORK INTERVENTIONS'CHARACTERISTICS, EFFECTIVENESS, AND APPLICABILITY. *Issues in mental health nursing*. 26(6), 591–609. https://doi.org/10.1080/01612840590959425

Peterson, C. (2006). *A Primer in Positive Psychology*. Oxford: Oxford University Press.

Peterson, C., & Seligman, M. E. P. (2004). *Character Strengths and Virtues: A Handbook and Classification*. New York: Oxford University Press.

Peterson, S. J., Luthans, F., Avolio, B. J., Walumbwa, F. O., & Zhang, Z. (2011). PSYCHOLOGICAL CAPITAL AND EMPLOYEE PERFORMANCE: A LATENT GROWTH MODELING APPROACH. *Personnel psychology*. 64(2), 427–450. https://doi.org/10.1111/j.1744-6570.2011.01215.x

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common Method Bias in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of applied psychology*. 88(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. C., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *Leadership Quarterly*. 1(2), 107–142. https://doi.org/10.1016/1048-9843(90)90009-7

Portes, A. (1998). Social Capital: Its Origins and Applications in Modern Sociology. *Annual review of sociology*. 24(1), 1–24. https://doi.org/10.1146/annurev.soc.24.1.1

Pospeschill, M. (2006). *Statistische Methoden: Strukturen, Grundlagen, Anwendungen in Psychologie und Sozialwissenschaften*. Heidelberg: Spektrum Akademischer Verlag.

Quinones, M. A., & Tonidandel, S. (2003). Conducting Training Evaluation. In J. E. Edwards, J. C. Scott, & N. S. Raju (Eds.), *The Human Resources Program-Evaluation Handbook* (pp. 225–243). London: Sage.

Rasch, D., & Kubinger, K. (2006). *Statistik für das Psychologiestudium – Mit Softwareunterstützung zur Planung und Auswertung von Untersuchungen sowie zu sequentiellen Verfahren*. München: Spektrum Akademischer Verlag.

Rego, A., Sousa, F., Marques, C., & Cunha e, M. P. (2012). Authentic leadership promoting employees' psychological capital and creativity. *Journal of Business Research*. 65(3), 429–437. https://doi.org/10.1016/j.jbusres.2011.10.003

Rego, A., Sousa, F., Marques, C., & Pina e Cunha, M. (2012). Authentic leadership promoting employees' psychological capital and creativity. *Journal of Business Research*. 65(3), 429–437.

Roche, M., Haar, J. M., & Luthans, F. (2014). The role of mindfulness and psychological capital on the well-being of leaders. *Journal of Occupational Health Psychology*. 19(4), 476–489. https://doi.org/10.1037/a0037183

Roepke, A. M., Jaffee, S. R., Riffle, O. M., McGonigal, J., & Broome, R.: Maxwell, B. (2015). Randomized Controlled Trial of SuperBetter, a Smartphone-Based/Internet-Based Self-Help Tool to Reduce Depressive Symptoms. *Games for health journal*. 4(3), 235–246. https://doi.org/10.1089/g4h.2014.0046

Ruch, W., & Proyer, R. T. (2011). Positive Interventionen: Stärkenorientierte Ansätze. In R. Frank (Ed.), *Therapieziel Wohlbefinden: Ressourcen aktivieren in der Psychotherapie*. Heidelberg: Springer.

Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The Motivational Pull of Video Games: A Self-Determination Theory Approach, *Motivation and Emotion*30(4), 344–360. https://doi.org/10.1007/s11031-006-9051-8

Salanova, M., Lorente, L., Chambel, M. J., & Martínez, I. M. (2011). Linking transformational leadership to nurses' extra-role performance: the mediating role of self-efficacy and work engagement. *Journal of Advanced Nursing*. 67(10), 2256–2266. https://doi.org/10.1111/j.1365-2648.2011.05652.x

Salen, K., & Zimmerman, E. (2004). *Rules of Play: Game Design Fundamentals*. Cambridge, MA: MIT press.

Sarantakos, S. (2013). *Social Research* (4th ed.). London: Red Globe Press.

Sattler, C., & Sonntag, K. (2016). Evaluation: Güte und Qualität personaler Förderung sichern. In K. Sonntag (Ed.), *Personalentwicklung in Organisationen: Psychologische Grundlagen, Methoden und Strategien* (4th ed., pp. 603–627). Göttingen: Hogrefe.

Scandura, T. A. (1992). Mentorship and career mobility: An empirical investigation. *Journal of Organizational Behavior*. 13(2), 169–174. https://doi.org/10.1002/job.4030130206

Schaufeli, W. B., & Bakker, A. B. (2003). *Test Manual for the Utrecht Work Engagement Scale*. Unpublished manuscript, Utrecht University, the Netherlands. Retrieved from https://www.schaufeli.com.

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The Measurement of Engagement and Burnout: A Two Sample Confirmatory Factor Analytic Approach. *Journal of Happiness studies*. 3(1), 71–92. https://doi.org/10.1023/A:1015630930326

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology*. 4(3), 219–247. https://doi.org/10.1037/0278-6133.4.3.219

Schmitt, N., & Stults, D. M. (1985). Factors Defined by Negatively Keyed Items: The Result of Careless Respondents? *Applied Psychological Measurement*. 9(4), 367–373. https://doi.org/10.1177/014662168500900405

Schneider, S. L. (2001). In Search of Realistic Optimism: Meaning, Knowledge, and Warm Fuzziness. *American psychologist*. 56(3), 250–263.

Schubert, P., Paulsen, L., & Hager, J. (2014). Auswirkungen von Gamification in Enterprise Collaboration Systems. In M. Koch, A. Butz, & J. Schlichter (Eds.), *Mensch und Computer 2014 - Tagungsband: 14. Fachübergreifende Konferenz für Interaktive und Kooperative Medien Interaktiv unterwegs - Freiräume gestalten* (pp. 3–14). München: Oldenbourg Wissenschaftsverlag.

Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human-Computer Studies*. 74, 14–31. https://doi.org/10.1016/j.ijhcs.2014.09.006

Seligman, M. E. P. (1998). *Learned Optimism: How to Change Your Mind and Your Life*. New York, NY: Vintage Books.

Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York: Free Press.

Seligman, M. E. P. (2006). *Learned Optimism: How to Change Your Mind and Your Life*. New York: Vintage.

Seligman, M. E. P. (2011). *Flourish: A Visionary New Understanding of Happiness and Well-being*. New York, NY: Atria Books.

Seligman, M. E. P., Parks, A. C., & Steen, T. (2004). A balanced psychology and a full life. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*. 359(1449), 1379–1381. https://doi.org/10.1098/rstb.2004.1513

Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive Psychology Progress: Empirical Validation of Interventions. *American psychologist*. 60 (5), 410–421. https://doi.org/10.1037/0003-066X.60.5.410

Shachar, M., & Neumann, Y. (2003). Differences Between Traditional and Distance Education Academic Performances: A Meta-Analytic Approach. *International Review of Research in Open and Distributed Learning*. 4(2), 1–20. https://doi.org/10.19173/irrodl.v4i2.153

Shauchenka, N., Ternès, A., & Towers, I. (2014). Gamification. In A. Ternès & I. Towers (Eds.), *Internationale Trends in der Markenkommunikation: Was Globalisierung, neue Medien und Nachhaltigkeit erfordern* (pp. 33–50). Wiesbaden: Springer.

Sheldon, K. M., Kashdan, T. B., & Steger, M. F. (2010). *Designing Positive Psychology: Taking Stock and Moving Forward*. Oxford, UK: Oxford University Press.

Shelton, C. D., & Darling, J. R. (2003). From theory to practice: using new science concepts to create learning organizations. *The Learning Organization.* 10(6), 353–360. https://doi.org/10.1108/09696470310497195

Singh, P., Suar, D., & Leiter, M. P. (2012). Antecedents, Work-Related Consequences, and Buffers of Job Burnout Among Indian Software Developers. *Journal of Leadership & Organizational Studies*. 19(1), 83–104. https://doi.org/10.1177/1548051811429572

Sitzmann, T., Kraiger, K., Stewart, D., & Wisher, R. (2006). The Comparative Effectiveness of Web-Based and Classroom Instruction: A Meta-Analysis. *Personnel psychology*. 59(3), 623–664. https://doi.org/10.1111/j.1744-6570.2006.00049.x

Six, B., & Felfe, J. (2004). Einstellungen und Werthaltungen im organisationalen Kontext. In H. Schuler (Ed.), *Organisationspsychologie - Grundlagen und Personalpsychologie* (pp. 597–672). Göttingen: Hogrefe.

Skinner, B. F. (1953). *Science and Behavior*. New York, NY: Simon & Schuster.

Smith, G. G., Sorensen, C., Gump, A., Heindel, A. J., Caris, M., & Martinez, C. D. (2011). Overcoming student resistance to group work: Online versus face-to-face. *The Internet and Higher Education*. 14(2), 121–128. https://doi.org/10.1016/j.iheduc.2010.09.005

Smith, P. C., Kendall, L. M., & Hulin, C. L. (1969). *The Measurement of Satisfaction in Work and Retirement: A Strategy for the Study of Attitudes*. Chicago, IL: Rand McNally.

Snyder, C. R. (1994a). Hope and Optimism. In S. Ramachandran (Ed.), *Encyclopedia of Human Behavior* (pp. 535–542). San Diego, CA: Academic Press.

Snyder, C. R. (1994b). *The Psychology of Hope: You Can Get There from Here*. New York, NY: Free Press.

Snyder, C. R. (1995). Conceptualizing, Measuring, and Nurturing Hope. *Journal of Counseling & Development*. 73(3), 355–360. https://doi.org/10.1002/j.1556-6676.1995.tb01764.x

Snyder, C. R. (2000). *Handbook of Hope: Theory, Measures, and Applications*. San Diego, CA: Academic Press.

Snyder, C. R. (2002). Hope Theory: Rainbows in the Mind. *Psychological Inquiry*. 13(4), 249–275. https://doi.org/10.1207/S15327965PLI1304_01

Snyder, C. R., Harris, C., Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S. T., . . . Harney, P. (1991). The will and the ways: Development and validation of an individual-differences measure of hope. *Journal of Personality and Social Psychology*. 60(4), 570–585. https://doi.org/10.1037/0022-3514.60.4.570

Snyder, C. R., Ilardi, S., Michael, S. T., & Cheavens, J. (2000). Hope theory: Updating a common process for psychological change. In C. R. Snyder & R. E. Ingram (Eds.), *Handbook of psychological change: Psychotherapy process and practices for the 21st century* (pp. 128–153). New York, NY: Wiley.

Snyder, C. R., Irving, L., & Anderson, J. R. (1991). Hope and Health: Measuring the Will and the Ways. In C. R. Snyder & D. R. Forsyth (Eds.), *Handbook of Social and Clinical Psychology: The Health Perspective*. New York: Pergamon Press.

Snyder, C. R., LaPointe, A. B., Crowson, J. J., & Early, S. (1998). Preferences of High- and Low-hope People for Self-referential Input. *Cognition and Emotion*. 12(6), 807–823. https://doi.org/10.1080/026999398379448

Snyder, C. R., Lopez, S. J., & Pedrotti, J. T. (2011). *Positive Psychology: The Scientific and Practical Explorations of Human Strengths*. Oxford, UK: Sage.

Snyder, C. R., Rand, K. L., & Sigmon, D. R. (2002a). Hope theory. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of Positive Psychology* (pp. 257–276). New York: Oxford University Press.

Snyder, C. R., Rand, K. L., & Sigmon, D. R. (2002b). Hope Theory: A Member of the Positive Psychology Family. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of Positive Psychology* (pp. 257–276). New York: Oxford University Press.

Snyder, C. R., Sympson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. L. (1996). Development and Validation of the State Hope Scale. *Journal of Personality and Social Psychology*. 70(2), 321–335. https://doi.org/10.1037/0022-3514.70.2.321

Sonntag, K., Frieling, E., & Stegmaier, R. (2012). *Lehrbuch Arbeitspsychologie*. Bern: Huber.

Spector, P. E. (2006). Method Variance in Organizational Research: Truth or Urban Legend? *Organizational Research Methods*. 9(2), 221–232. https://doi.org/10.1177/1094428105284955

Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A Socially Embedded Model of Thriving at Work. 16(5), 537–549. https://doi.org/10.1287/orsc.1050.0153

Spreitzer, G. M., & Sonenshein, S. (2004). Toward the Construct Definition of Positive Deviance. *American Behavioral Scientist*. 47(6), 828–847. https://doi.org/10.1177/0002764203260212

Stajkovic, A. D., & Luthans, F. (1998a). Self-efficacy and work-related performance: A meta-analysis. *Psychological bulletin*. 124(2), 240–261. https://doi.org/10.1037/0033-2909.124.2.240

Stajkovic, A. D., & Luthans, F. (1998b). Social Cognitive Theory and Self-Efficacy: Going Beyond Traditional Motivational and Behavioral Approaches. *Organizational dynamics*. 26(4), 62–74. https://doi.org/10.1016/S0090-2616(98)90006-7

Stajkovic, A. D., & Luthans, F. (2003). Behavioral management and task performance in organizations: Conceptual background, meta-analysis, and test of alternative models. *Personnel psychology*. 56(1), 155–194. https://doi.org/10.1111/j.1744-6570.2003.tb00147.x

Stieglitz, S. (2017). Enterprise Gamificaction - Vorgehen und Anwendung. In S. Strahringer & C. Leyh (Eds.), *Gamification und Serious Games: Grundlagen, Vorgehen und Anwendungen* (3-13). Wiesbaden: Springer Vieweg. https://doi.org/10.1007/978-3-658-16742-4_1

Sweetman, D., Luthans, F., Avey, J. B., & Luthans, B. C. (2011). Relationship between positive psychological capital and creative performance. *Canadian Journal of Administrative Sciences*. 28(1), 4–13. https://doi.org/10.1002/cjas.175

Teece, D. J. (2011). *Dynamic Capabilities and Strategic Management: Organizing for Innovation and Growth*. New York, NY: Oxford University Press.

Thoits, P. A. (1994). Stressors and Problem-Solving: The Individual as Psychological Activist. *Journal of Health and Social Behavior*. 35(2), 143–160. https://doi.org/10.2307/2137362

Totterdell, P., Wood, S., & Wall, T. (2006). An intra-individual test of the demands-control model: A weekly diary study of psychological strain in portfolio workers. *Journal of Occupational and Organizational Psychology*. 79(1), 63–84. https://doi.org/10.1348/096317905X52616

Van Veldhoven, M., & Peccei, R. (Eds.) (2014). *Well-being and Performance at Work: The role of content*. New York, NY: Psychology Press.

Vesa, M., Hamari, J., Harviainen, J. T., & Warmelink, H. (2017). Computer Games and Organization Studies. *Organization Studies*. 38(2), 273–284. https://doi.org/10.1177/0170840616663242

Vogt, W. P., & Johnson, R. B. (2015). *The SAGE Dictionary of Statistics & Methodology: A Nontechnical Guide for the Social Sciences* (5th ed). Los Angeles, CA: Sage Publications.

Wagner, E. D. (1994). In Support of a Functional Definition of Interaction. *American Journal of Distance Education*. 8(2), 6–29. https://doi.org/10.1080/08923649409526852

Walumbwa, F. O., Luthans, F., Avey, J. B., & Oke, A. (2011). Authentically leading groups: The mediating role of collective psychological capital and trust. *Journal of Organizational Behavior*. 32(1), 4–24. https://doi.org/10.1002/job.653

Wang, Y., Liu, L., Wang, J., & Wang, L. (2012). Work-family Conflict and Burnout among Chinese Doctors: The Mediating Role of Psychological Capital. *Journal of Occupational Health*. 54(3), 232–240. https://doi.org/10.1539/joh.11-0243-OA

Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology*. 52(2), 129–148. https://doi.org/10.1111/j.2044-8325.1979.tb00448.x

Waugh, C. E., Fredrickson, B. L., & Taylor, S. F. (2008). Adapting to life's slings and arrows: Individual differences in resilience when recovering from an anticipated threat. *Journal of research in personality*. 42(4), 1031–1046. https://doi.org/10.1016/j.jrp.2008.02.005

Witt, M., Scheiner, C. W., & Robra-Bissantz, S. (2011). Gamification of Online Idea Competitions: Insights from an Explorative Case. In *Proceedings of INFORMATIK 2011 - Lecture Notes in Informatics*.

Wolf, T., Weiger, W. H., & Hammerschmidt, M. Gamified Digital Services: How Gameful Experiences Drive Continued Service Usage. In *Proceedings of th 51st Hawaii International Conference on System Sciences 2018* (pp. 1187–1196).

Woolley, L., Caza, A., & Levy, L. (2011). Authentic Leadership and Follower Development: Psychological Capital, Positive Work Climate, and Gender. *Journal of Leadership & Organizational Studies*. 18(4), 438–448. https://doi.org/10.1177/1548051810382013

Worthen-Chaudhari, L., McGonigal, J., Logan, K., Bockbrader, M. A., Yeates, K. O., & Mysiw, W. J. (2017). Reducing concussion symptoms among teenage youth: Evaluation of a mobile health app. *Brain injury*. 31(10), 1279-1286. https://doi.org/10.1080/02699052.2017.1332388

Wottawa, H., & Thierau, H. (2003). *Lehrbuch Evaluation* (3rd). Huber: Stuttgart.

Youssef, C. M., & Luthans, F. (2007). Positive Organizational Behavior in the Workplace: The Impact of Hope, Optimism and Resilience. *Journal of management*. 33(5), 774–800. https://doi.org/10.1177/0149206307305562

Youssef, C. M., & Luthans, F. (2011). Positive Psychological Capital in the Workplace: Where We Are and Where We Need to Go. In K. M. Sheldon, T. B. Kashdan, & M. F. Steger (Eds.), *Designing Positive Psychology: Taking Stock and Moving Forward* (pp. 351–364). New York: Oxford University Press.

Youssef-Morgan, C. M., & Luthans, F. (2013). Psychological Capital Theory: Toward a Positive Holistic Model. In A. B. Bakker (Ed.), *Advances in Positive Organizational Psychology* (pp. 145–166). Bingley: Emerald Group Publishing Limited. https://doi.org/10.1108/S2046-410X(2013)0000001009

Zichermann, G. (2011). Intrinsic and Extrinsic Motivation in Gamification. Retrieved from https://www.gamification.co/2011/10/27/intrinsic-and-extrinsic-motivation-in-gamification/

Zöfel, P. (2003). *Statistik für Psychologen*. München: Pearson Studium.

Video, Article, and Infographic References (Study 1)

Video References

Hope

Fresno State Kremen School of Education. (2016, December 2). *Hope Theory - Make Your Life Better* [Video]. YouTube. https://www.youtube.com/watch?v=ZuHZhi1B4T4&feature=youtu.be

MindToolsVideos. (2014, March 5). *Personal Goal Setting* [Video]. YouTube. https://www.youtube.com/watch?v=yux_m8AdzwY

UMNCSH. (2013, May 7). *Interview with Dr. Shane Lopez* [Video]. YouTube. https://www.youtube.com/watch?v=Bka3sI5_WZ4

Self-efficacy

ProfoundSelfImprovement. (2017, February 20). *How to Build Confidence in Your Abilities #1: What Is Self-Efficacy?* [Video]. YouTube. https://www.youtube.com/watch?v=dWdidScUa9k

ProfoundSelfImprovement. (2017, February 24). *How to Build Confidence in Your Abilities #2: How Self-Efficacy Affects Your Life* [Video]. YouTube. https://www.youtube.com/watch?v=t4FV24fIUI4

ProfoundSelfImprovement. (2017, March 28). *How to Build Confidence in Your Abilities #3: The Experience of Mastery* [Video]. YouTube. https://www.youtube.com/watch?v=SUJH-lTnPGk

ProfoundSelfImprovement. (2017, March 6). *How to Build Confidence in Your Abilities #5: Social Modeling* [Video]. YouTube. https://www.youtube.com/watch?v=ZfRDeruhomc

Resilience

Hify - The Greatest Minds (2016, March 18). *How to Be More Resilient* [Video]. YouTube. https://www.youtube.com/watch?v=EuMfe2ZtJA4

Niall Kennedy. (2015, March 3). *Resilience in the Workplace* [Video]. YouTube. https://www.youtube.com/watch?v=l73F4j1Xa0Q

The Audiopedia. (2017, May 7). *What is PSYCHOLOGICAL RESILIENCE? What does PSYCHOLOGICAL RESILIENCE mean?* [Video]. YouTube, https://www.youtube.com/watch?v=7OF5_rT6tQw

Optimism

Happierdotcom. (2009, October 4). *Dr. Seligman's Definition of Optimism* [Video]. YouTube. https://www.youtube.com/watch?v=8-rMuJW-UKg

Live Happy. (2017, May 9). *Create Optimism - Thriving at Work and Life* [Video]. YouTube. https://www.youtube.com/watch?v=2S-wG29PUI4

Practical Psychology. (2016, April 8). *Learned Optimism Positive Psychology - Martin Seligman - Animated Book Review* [Video]. YouTube. https://www.youtube.com/watch?v=6tN9wMbdqZU

Article References

MindTools (2014, March 5). Personal Goal Setting: Planning to Live Your Life Your Way. https://www.mindtools.com/page6.html

Winbolt, B. (2016, January 21). 9 Ways to Improve Your Resilience at Work. https://www.barrywinbolt.com/resilience-at-work/

Moore, C. (2017, June 7). Learned Optimism: Is Martin Seligman's Glass Half Full?. https://positivepsychology.com/learned-optimism

Infographic References

Happify (2015, December 3). INFOGRAPHIC: The Science-Based Secrets to Boosting Your Confidence. https://www.happify.com/hd/boost-your-self-confidence-infographic/

Happify (2017, December 28). INFOGRAPHIC: 17 Science-Backed Secrets to Achieving Your Goals. https://www.happify.com/hd/how-science-can-help-you-stick-to-your-goals-infographic/

Happify (2017, March 29). INFOGRAPHIC: Science-Backed Strategies for Building Resilience. https://www.happify.com/hd/how-to-build-resilience-infographic/

Happify (2017, March 7). INFOGRAPHIC: Why Being More Optimistic Can Give You a Health (and Life) Boost. https://www.happify.com/hd/optimism-infographic/

Appendices

Appendix A: Invitation Text of Gamified Online Training *HERO of the Jungle* (Study 1)

Dear colleagues,
preparing for the future not only means upskilling yourself in latest technology trends, but also taking care of your personal resources. I recently launched together with a colleague my first gamified online training called *HERO of the Jungle*.

WHAT IS THE GAMIFIED ONLINE TRAINING *HERO OF THE JUNGLE*?
The gamified online training *HERO of the Jungle* is a gamified, social and experiential virtual jungle tour learning experience. It will be relevant for those interested in personal development as well as strategies for developing their individual resources.

WHAT'S IN IT FOR ME?
You have got the great possibility to develop vital mind skills and strategies for achieving personal growth and success at work, individually or as a team. Research in over 12,000 people shows that the more mind skills one person has, the greater his/her wellbeing, engagement and satisfaction at work.

HOW TO START
Curious? Join the gamified online training *HERO of the Jungle* page with further instructions and everything you need to know. To provide you with the best learning experience and to start the gamified online training, please participate in this **pre-survey**. To collect data for analyzing specific resources over time, it would be great if you could complete the anonymous online survey again directly after, and two months after having attended the gamified online training.

If you have any questions, feel free to contact me.

Thank you for taking part in the gamified online training *HERO of the Jungle*.

Kind regards,
Maren Dewald, Doctoral candidate

Appendix B: Online Survey[3]

Disclaimer:

This is an anonymous survey. Your ID or e-mail address will not be recorded with the survey.

Info: To guarantee anonymity but nevertheless being able to make individual statements, we kindly ask you to fill in the following code.

	Please see the **example**:
First two letters of your mother's first name:	1. Maria → **MA**
First two letters of your father's first name:	2. David → **DA**
Month of birth as number:	3. March → **03**
First two letters of your place of birth:	4. Rome → **RO**

The code would be 'MADA03RO'. Please tell us your code:

On what day will you attend the workshop?[4]

_____

[3] The sources of the scales used in the online survey can be found in chapter 2.3

[4] This question was only raised to the participants of the classroom training (Study 2).

Below are statements that describe how you may think about yourself right now. Use the following scales to indicate your level of agreement or disagreement with each statement.

		Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1.	I feel confident analyzing a long-term problem to find a solution.	1	2	3	4	5	6
2.	I feel confident in representing my work area in meetings with management.	1	2	3	4	5	6
3.	I feel confident contributing to discussions about the company's strategy.	1	2	3	4	5	6
4.	I feel confident helping to set targets/goals in my work area.	1	2	3	4	5	6
5.	I feel confident contacting people outside the company (e.g., suppliers, customers) to discuss problems.	1	2	3	4	5	6
6.	I feel confident presenting information to a group of colleagues.	1	2	3	4	5	6
7.	If I should find myself in a jam at work, I could think of many ways to get out of it.	1	2	3	4	5	6
8.	At the present time, I am energetically pursuing my work goals.	1	2	3	4	5	6
9.	There are lots of ways around any problem.	1	2	3	4	5	6
10.	Right now, I see myself as being pretty successful at work.	1	2	3	4	5	6
11.	I can think of many ways to reach my current work goals.	1	2	3	4	5	6
12.	At this time, I am meeting the work goals that I have set for myself.	1	2	3	4	5	6

Continued

13.	When I have a setback at work, I have trouble recovering from it, moving on.	1	2	3	4	5	6
14.	I usually manage difficulties one way or another at work.	1	2	3	4	5	6
15.	I can be “on my own,” so to speak, at work if I have to.	1	2	3	4	5	6
16.	I usually take stressful things at work in stride.	1	2	3	4	5	6
17.	I can get through difficult times at work because I’ve experienced difficulty before.	1	2	3	4	5	6
18.	I feel I can handle many things at a time at this job.	1	2	3	4	5	6
19.	When things are uncertain for me at work, I usually expect the best.	1	2	3	4	5	6
20.	If something can go wrong for me work-wise, it will.	1	2	3	4	5	6
21.	I always look on the bright side of things regarding my job.	1	2	3	4	5	6
22.	I’m optimistic about what will happen to me in the future as it pertains to work.	1	2	3	4	5	6
23.	In this job, things never work out the way I want them to.	1	2	3	4	5	6
24.	I approach this job as if “every cloud has a silver lining.”	1	2	3	4	5	6

The following statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job.

		Never	Almost never (a few times a year or less)	Rarely (once a month or less)	Some-times (a few times a month)	Often (once a week)	Very often (a few times a week)	Always (Every day)
1.	At my work, I feel bursting with energy.	0	1	2	3	4	5	6
2.	I find the work that I do full of meaning and purpose.	0	1	2	3	4	5	6
3.	Time flies when I'm working.	0	1	2	3	4	5	6
4.	At my job, I feel strong and vigorous.	0	1	2	3	4	5	6
5.	I am enthusiastic about my job.	0	1	2	3	4	5	6
6.	When I am working, I forget everything else around me.	0	1	2	3	4	5	6
7.	My job inspires me.	0	1	2	3	4	5	6
8.	When I get up in the morning, I feel like going to work.	0	1	2	3	4	5	6
9.	I feel happy when I am working intensely.	0	1	2	3	4	5	6
10.	I am proud on the work that I do.	0	1	2	3	4	5	6
11.	I am immersed in my work.	0	1	2	3	4	5	6
12.	I can continue working for very long periods at a time.	0	1	2	3	4	5	6
13.	To me, my job is challenging.	0	1	2	3	4	5	6
14.	I get carried away when I’m working.	0	1	2	3	4	5	6
15.	At my job, I am very resilient, mentally.	0	1	2	3	4	5	6
16.	It is difficult to detach myself from my job.	0	1	2	3	4	5	6
17.	At my work I always persevere, even when things do not go well.	0	1	2	3	4	5	6

Please read each of the following statements and indicate your level of agreement or disagreement.

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1.	Overall, I am satisfied with the kind of work I do.	1	2	3	4	5
2.	Overall, I am satisfied with the organization I work for.	1	2	3	4	5
3.	Overall, I am satisfied with my job.	1	2	3	4	5

Listed below is a series of statements that represent feelings that individuals might have about the company or organization for which they work. Please indicate the degree of your agreement or disagreement with each statement using the scale below.

		Strongly Disagree	Disagree	Slightly Disagree	Unde-cided	Slightly Agree	Agree	Strongly Agree
1.	I would be very happy to spend the rest of my career with this organization.	1	2	3	4	5	6	7
2.	Right now, staying with my organization is a matter of necessity as much as desire.	1	2	3	4	5	6	7
3.	I do not feel any obligation to remain with my current employer.	1	2	3	4	5	6	7
4.	I really feel as if this organization's problems are my own.	1	2	3	4	5	6	7
5.	It would be very hard for me to leave my organization right now, even if I wanted to.	1	2	3	4	5	6	7
6.	Even if it were to my advantage, I do not feel it would be right to leave my organization now.	1	2	3	4	5	6	7
7.	I do not feel a strong sense of "belonging" to my organization.	1	2	3	4	5	6	7

8.	Too much of my life would be disrupted if I decided I wanted to leave my organization now.	1	2	3	4	5	6	7
9.	I would feel guilty if I left my organization now.	1	2	3	4	5	6	7
10.	I do not feel "emotionally attached" to this organization.	1	2	3	4	5	6	7
11.	I feel that I have too few options to consider leaving this organization.	1	2	3	4	5	6	7
12.	This organization deserves my loyalty.	1	2	3	4	5	6	7
13.	I do not feel like "part of the family" at my organization.	1	2	3	4	5	6	7
14.	If I had not already put so much of myself into this organization, I might consider working elsewhere.	1	2	3	4	5	6	7
15.	I would not leave my organization right now because I have a sense of obligation to the people in it.	1	2	3	4	5	6	7
16.	This organization has a great deal of personal meaning for me.	1	2	3	4	5	6	7
17.	One of the few negative consequences of leaving this organization would be the scarcity of available alternatives.	1	2	3	4	5	6	7
18.	I owe a great deal to my organization.	1	2	3	4	5	6	7

Background information

1) In which region do you work for the company?

☐ APJ (Asia Pacific, and Japan)

☐ EMEA North (Europe, Middle East and Africa)

☐ EMEA South (Europe, Middle East and Africa)

☐ Germany

☐ Greater China

☐ MEE except Germany (Middle and Eastern Europe)

☐ NA (North America)

☐ LAC (Latin and Central America)

☐ N.A. – No answer

2) What is your gender?

☐ Male ☐ Female ☐ N.A. - No answer

3) What is your age?

☐ 18-29 years ☐ 30-39 years ☐ 40-49 years

☐ 50-59 years ☐ 60+ years ☐ N.A. - No answer

4) What is the highest degree of your educational background?

☐ Secondary school (high school) ☐ High school graduate

☐ Bachelor's degree ☐ Master's degree / Diploma / Magister

☐ Doctorate degree ☐ Other, please specify_____

☐ N.A. - No answer

5) What is your current employment status?

☐ Full-time ☐ Part-time

☐ Other, please specify _____ ☐ N.A. - No answer

6) How long have you been working at the company?

☐ 0-2 years ☐ 3-5 years ☐ 6-10 years

☐ 11-15 years ☐ 16 - 20 years ☐ More than 21 years

☐ N.A. - No answer

Follow-up Notification

Please provide us your e-mail address so that we can contact you for the second and third measurement point. This is very important for the data collection and later analysis.

Important: The questionnaire results are separated from the e-mail addresses and cannot be associated with each other.

Your e-mail address:

We thank you for your time spent taking this survey.

Your response has been recorded.

Evaluation

Gamified online training

		Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1.	I would recommend the gamified online training *HERO of the Jungle* to a friend or colleague.	1	2	3	4	5	6
2.	There was a good balance between theoretical and practical learning activities.	1	2	3	4	5	6
3.	The exercises were well suited to convey the content.	1	2	3	4	5	6
4.	I liked the format and design of the gamified online training.	1	2	3	4	5	6
5.	I will be able to apply what I have learned to my job.	1	2	3	4	5	6

Open questions gamified online training

1. What did you like most about the gamified online training?
2. What suggestions for improvement do you have?
3. What exactly did you learn in the gamified online training?
4. Do you remember especially interesting / exciting videos / tasks / quizzes? If so, why do you remember them?
5. In case you did not reach the target (250 XP and more), what was the reason?

Classroom training

		Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1.	I would recommend the classroom training *Personal Resource Development* to a friend or colleague.	1	2	3	4	5	6
2.	There was a good balance between theoretical and practical learning activities.	1	2	3	4	5	6
3.	The exercises were well suited to convey the content.	1	2	3	4	5	6
4.	The trainer was proficient.	1	2	3	4	5	6
5.	The trainer delivered the content in a knowledgeable and engaging way.	1	2	3	4	5	6
6.	I will be able to apply what I have learned to my job.	1	2	3	4	5	6

Open questions classroom training

1. What did you like most about the classroom training?
2. What suggestions for improvement do you have?
3. What exactly did you learn in the classroom training?
4. Do you remember especially interesting / exciting videos / tasks / quizzes? If so, why do you remember them?

Follow-up Evaluation[5]

1. I applied the learning content from the workshop in my job.
2. I experienced a noticeable positive change in my behavior back on the job.

[5] The two follow-up evaluation questions were only raised to participants from the classroom training at T3.

Appendix C: Handouts of Gamified Online Training (Study 1)[6]

Hope exercise 1:

Developing Hope in the Workplace

Use this worksheet to reflect on the following questions

Watch the video "Interview with Dr. Shane Lopez" (video length 9:40 min) and answer the following questions for yourself:

1. How do hopeful people differ from less hopeful people in their thoughts and actions?

2. How do hopeful employees think and behave differently from their less hopeful counterparts?

1. Hopeful people differ from less hopeful people in …

2. Hopeful employees think/behave …

Small self-test on hope: Answer the following questions by ticking on box with an "x".

Question	YES	NO
Are you strong willed?		
Are you determined to achieve your goals?		
Do you feel you are in control of your own destiny?		
Can you go relentlessly for hours, days, even months until you have accomplished what you have set your mind to do?		
Is it difficult to distract you away from your targeted endeavors?		
When there are no set goals for you, do you tend to set your own?		
Are the goals you set for yourself extremely challenging?		
Do you enjoy engaging in such goals?		

If your answers are mostly "YES" to these types of questions, then you are indicating the willpower component of hope.

[6] The content for the handouts of the practice chapters in the gamified online training is adapted from Luthans et al. (2015).

Hope Exercise 2:

Developing Hope in the Workplace

Use this worksheet to write down your experiences

Watch the video 'Hope Theory – Make your Life Better'. You will learn some key insights from research in Positive Psychology that will help you overcome obstacles and develop your full potential. The psychologist Professor Rick Snyder developed hope theory and stated that hope consists of three components: 1) goals, 2) pathways, and 3) agency. He discovered that hopeful people develop many pathways to reach their goals, because they anticipate obstacles and do not expect things to be easy. They have high levels of agency. That means they persist and sustain their motivation to move towards their goals, they are energized and come up with new and different plans to overcome obstacles.

Let's get started and use hope theory to make your (working) life better.

Step 1: Goal setting

Write down a SMART* goal you want to work on attaining in the next months (e.g., learn Spanish in 6 months).

My SMART goal that I want to work on attaining is:

Step 2: Pathway development

In order to reach your goal at work, write down a pathway (e.g., find a language school).

A pathway/sub goal to help me reach my goal is:

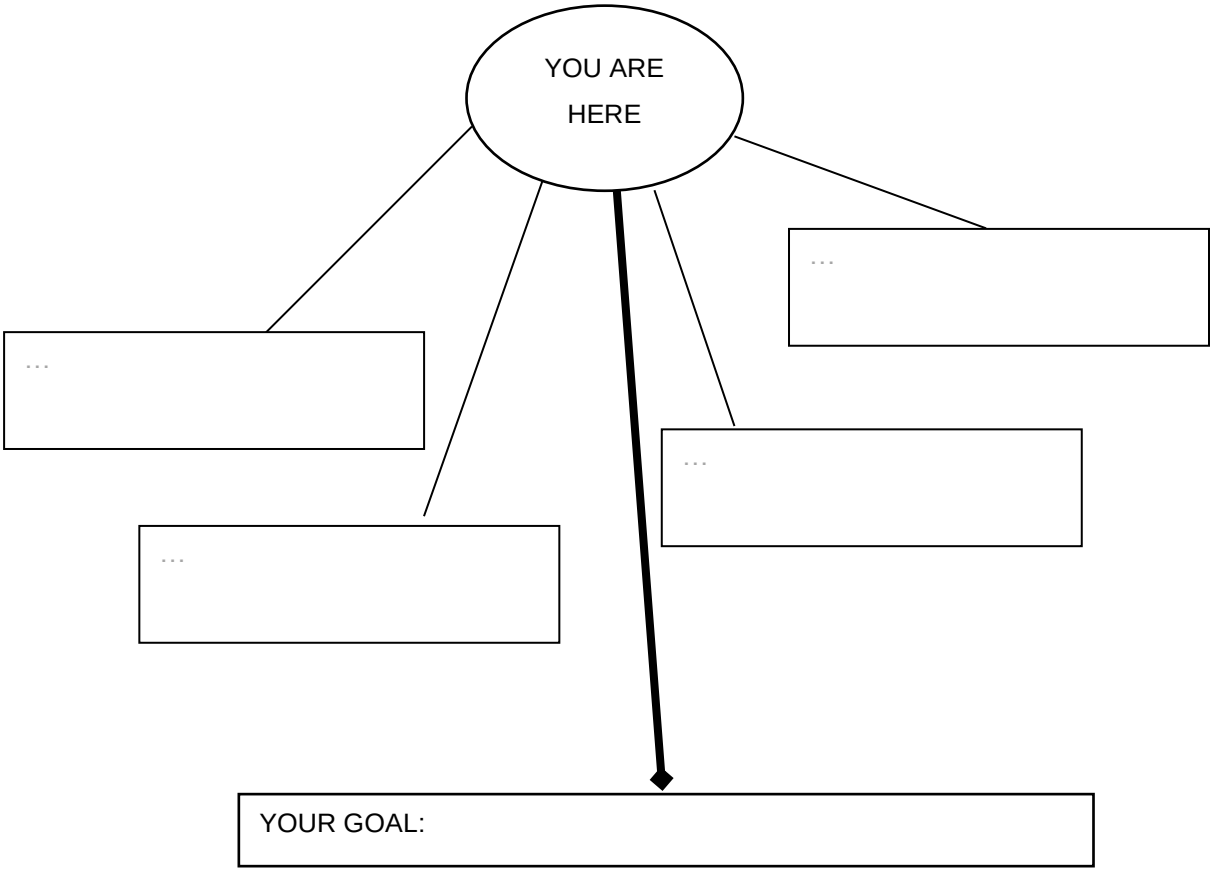
* SMART: specific, measurable, attainable, relevant and time-bound

Develop additional pathways/sub goals that come into your mind (e.g., when your goal is to get an MBA, sub goal 1 could be to search for schools, sub goal 2 could be to apply for schools etc.).

My sub goals /next steps to attain my SMART goal at work are:

Step 3: Overcoming Obstacles

What are obstacles that may hold you back? (e.g., costs for MBA are high, time management etc.). Use the figure below to illustrate your potential obstacles.



"Hopeful thought reflects the belief that one can find pathways to desired goals and become motivated to use those pathways" (Snyder, Shane & Lopez, 2002)

Hope exercise 3:

Developing Hope in the Workplace

Use this worksheet to write down your experiences

Think about the last very difficult situation you were confronted with at work. What was the situation?

The last very difficult situation I was confronted with at work was …

Use the following questions as your guide.

1) What happened once you were alerted to this situation in terms of the way you thought about it and the way you addressed it?
2) Did you find yourself ruminating at some point? Or were you able to realize you were ruminating and turn your attention to exploring difficult pathways of possibilities?
3) Specifically, were you able to reframe the challenge to keep moving forward to new pathways?

My thoughts about the situation at first were ….
I was (not) ruminating over the situation by …
I was (not) able reframe the challenge in ….

Besides the will and the way, there are many possible circumstances that may affect your level of hope. For example, how would you react if the following types of things happened in your life? Choose one of the examples and note down what your immediate, short-term response would be. What course(s) of action would you take over the long run?

1) You work for a toxic manager .
2) You manage totally disengaged employees.
3) A valued coworker gets has a serious illness.
4) You are passed over for a promotion a second time.

My reaction to … would be …
My immediate/short-term response would be…
Over the long run, I would …

Self-efficacy Exercise 1:

Developing Self-efficacy in the Workplace

Use this worksheet to write down your experiences

Mastery Experiences and Success

Write down a past success within one of your work topics and the reasons for the success (e.g., a technical project that went well because of highly motivated team members and a positive working atmosphere).

My past success at work:

Vicarious Learning/Modelling

Imagine one of your colleagues/peers/manager as a role model in being successful at work. What is he/she doing differently in contrast to other people? Write down what comes into your mind.

My role model at work:

Self-efficacy Exercise 2:

Developing Self-efficacy in the Workplace

Use this worksheet to write down your experiences

Choose a **specific domain of your life** you feel **very confident** about (e.g., job, education, family, friendship, favorite sport, leadership role, hobby).
The domain of my life I feel very confident about is:

Note **various tasks** you need to **perform in this domain** in order to **achieve success** (e.g., at work, you may need your analytical skills to solve problems/make decisions etc.).
The list can become quite long when you break it down into the specific tasks within the selected life domain.

Task 1)
Task 2)
Task 3)
Task 4)
Task 5)
….

Now, **prioritize** your **list**: Focus on the **most critical three tasks**, those that have the biggest impact on overall success. Then, on a scale of 0% to 100%, how confident are you that you can

a) at least get by on these tasks,
b) meet your own and others expectations in performing these tasks and
c) excel in accomplishing these tasks?

Critical Task	% get by on the task	% meet own & others expectations	% excel in accomplishing the task
…	0% - 100%	0% - 100%	0% - 100%
…	0% - 100%	0% - 100%	0% - 100%
…	0% - 100%	0% - 100%	0% - 100%

Self-efficacy Exercise 3:

Developing Self-efficacy in the Workplace

Use this worksheet to write down your experiences.

For this exercise we ask you to leave your comfort zone and areas of mastery and to start focusing on your dreams and aspirations.

Choose any **domain of life** that you have **always wanted to try or to be better at** (e.g., job, education, family, friendship, favorite sport, leadership role, hobby).

The domain of my life I've always wanted to try/be better at is:

Note **various tasks** you need to **perform in this domain** in order to **achieve success** (e.g., at work, you may need your communication & negotiation skills in interacting with colleagues/customers to convince them etc.).

The list can become quite long when you break it down into the specific tasks within the selected life domain.

Task 1)
Task 2)
Task 3)
Task 4)
Task 5)
….

Now, **prioritize** your **list**: Focus on the **most critical three tasks**, those that have the biggest impact on overall success. Then, on a scale of 0% to 100%, how confident are you that you can

a) at least get by on these tasks,
b) meet your own and others expectations in performing these tasks and
c) excel in accomplishing these tasks?

Critical Task	% get by on the task	% meet own & others expectations	% excel in accomplishing the task
…	0% - 100%	0% - 100%	0% - 100%
…	0% - 100%	0% - 100%	0% - 100%
…	0% - 100%	0% - 100%	0% - 100%

Personal reflection (optional)

- Can you generalize what you are good at in one domain to the new, yet unexplored domain?
- What where some of your key discoveries with the exercise?
- Was the challenge you identified related to your strengths, or was it an area that had no previous linkage to what you felt confident in being able to?

Looking at the one domain in life where I feel confident and the new, yet unexplored domain in life, I can generalize that I am overall good at ….

My key discoveries are ….

The area had (no) previous linkage to what I feel confident about.

Resilience Exercise 1:

Developing Resilience in the Workplace

Use this worksheet to write down your experiences

When was the last time you encountered what you would consider to be **adversity**, **a conflict** or **failure** that you believe to has been overwhelming? What was the nature of this event or situation? Was it sudden and unexpected, or gradual and emotionally draining?

My last adverse situation:

For me it was …

What were some of the **coping strategies** you formulated and tried to implement (e.g., keeping a positive attitude, reading, doing sports, yoga/meditation, playing an instrument etc.)? How effective do you think these strategies were?

My coping strategies were:

They were (somehow) effective / not effective because…

What sort of support was available to you and what did you seek out? Do you think you eventually bounced back and fully recovered from this event/situation? Why? Why not?

My colleagues/manager/family member/friend was/were there to support me… I felt …

I recovered/bounced back because … / I did not fully recover from this event/situation because…

Resilience Exercise 2:

Developing Resilience in the Workplace

Use this worksheet to write down your experiences

Think about an **unfavorable event** that you recently encountered at work. What **resources** have you engaged to respond to the situation? (e.g., social networks, abilities, skills, talents etc.)

My resources:

It is important to be creative in **identifying personal resources** to help you **bounce back from this adverse situation**. What **additional resources** can you think of that can benefit or could have benefited you? (e.g., ideas from others, perseverance, positive outlook)

Additional resources that can benefit me/could have benefited me:

Resilience Exercise 3:

Developing Resilience in the Workplace

Use this worksheet to write down your experiences

Think about something that is **happening to you right now at work** (or in the past) that is **not going well** as you had hoped. What is the situation?

An event/situation at work that is/was not going well as I hoped:

How are you **currently responding**? Describe your **feelings** regarding the situation and be **specific**.

My response to the situation: I feel defeated/challenged/confused/energized because …

How can you **frame the issue**? As something you can control or not control? What is the **real impact** of the situation? How severe is the situation to you? What is **the real** risk to you? Who can control it if not you? Why? Please be specific.

The issue is something I can (not) control because … The real impact of the situation: My situation is severe to me because … My manager/colleague, peer can control the issue because he/she ….

In what **additional ways** can you look at the situation that will allow you to obtain more control to respond successfully now or the next time you are faced with the same or similar situation?

A new way to look at the situation:

Optimism Exercise 1:

Developing realistic Optimism in the Workplace

Use this worksheet to reflect on the questions

Watch the video "Dr. Martin Seligman's Definition of Optimism" and answer the following questions for yourself:

1) How do optimistic people differ from pessimistic people in their explanatory style?
2) When you reflect on your own explanatory style, is it generally optimistic or pessimistic? Think about specific situations (positive and negative).
3) Reflect on the explanatory styles of others that are close to you (immediate family, close friends, manager, coworkers). Which ones of them exhibit a more optimistic/pessimistic explanatory style? Which ones are happier and more successful?

1) Optimists tend to …

   Pessimists tend to …

2) My own explanatory style is generally …

3) The explanatory style of others (e.g. …) is …

   People who are optimistic tend to be …
   People who are pessimistic tend to be …

Optimism Exercise 2:

Developing realistic Optimism in the Workplace

Use this worksheet to write down your experiences

Identify a **highly memorable positive event** that **recently occurred** in your **life** (e.g., a work accomplishment, pleasant family event, exciting surprise, new relationship, revival of an old friendship, successful purchase etc.)

My positive event:

Once you can vividly recall the details of the event, answer as best you can the following questions. Remember, the more honest and thorough you are in your responses, the more insights you can gain.

Describe your selected positive event in detail by including your **thoughts, feelings, and behaviors before, during, and after the event occurred** (spending a little more time and attention on this should make the rest of the questions easier and faster to answer).

My thoughts/feelings/behaviors **before the event**:

My thoughts/feelings/behaviors **during the event**:

My thoughts/feelings/behaviors **after the event occurred**:

- Which of the **factors** that **led to** the **event** were **controlled by you**? (e.g., your talents, skills, resources)

Factors controlled by me:

- …
- …
- …

- Which of the **factors** would you consider to be **beyond your control** (e.g., luck, other people, external circumstances etc.)?

Factors beyond my control:

- …
- …
- …

- From the **external factors** you identified, are there **any** that you **could have had control over**? If so, how?

There were (no) external factors where I could have control over:

Now that you have reflected on the circumstances and causes of the selected positive event, we ask you to shift your thinking to a more **future-oriented perspective** and answer the following questions:

- Do you believe that in the future this type of positive event can happen again?
- From the factors that you believe to have contributed to the positive event (the ones within and outside of your control), which one(s) do you consider to be temporary, a coincidence or exist always?

In the future this type of positive event can (cannot) happen again because …

I consider the following factor(s) as temporary:

I consider the following factor(s) as coincidence:

I consider the following factor(s) as always existing:

Optimism Exercise 3:

Developing realistic Optimism in the Workplace

Use this worksheet to write down your experiences

For developing realistic optimism in the workplace there are three strategies you can apply:

1) Leniency for the past
2) Appreciation for the present
3) Opportunity for the future

1. Leniency for the past

Describe one of the main obstacle (or challenge) you have achieved at work in the past and write it down. What did go well? What did not go well?

One of the main obstacle/challenge that I have achieved in the past at work was …
Things that went well:
Things that did not go well:

2. Appreciation for the present

What is your current situation in the relation to the goal you have selected (see spider[7])? What are the three best things going on with your current situation?

[7] Behind the spider (Hope – Part 2 of 3) in the practice chapter, the participants are asked to select a SMART work-related goal they want to work on attaining.

My current situation:

The three best things going on with my current situation are:

1)

2)

3)

3. Opportunity for the future

Using your SMART goal from the previous exercise (see spider) please vividly and emotionally describe the desired state as if you have ALREADY attained that goal. What will it look/sound/taste/feel like? Very descriptive, write down the state or what it is going to feel like once you've already attained that goal.

Having attained my SMART goal feels/sounds/looks ...

"Live life as if everything is rigged in your favor" by Rumi

Appendix D: Quizzes of Gamified Online Training (Study 1)[8]

PsyCap element	Level	Question	A	B	C	D	E	Correct Answer[9]
Hope	Basic	What do you have to consider when setting up goals?	Stepping: Difficult, long-term, and possibly even overwhelming goals are broken down into smaller, proximate, and more manage-able milestones	Mental Rehearsals: Practice thoughts and actions by including facing and overcoming obstacles and switching to alternate pathways	Avoidance Goals: Goal framing in terms of what you should *not* do or where you do *not* want to end up	Stretch Goals: Difficult enough to stimulate excitement and exploration, yet still perceived to be within reach		A, B, D
	Intermediate	How do you pro-ceed when setting up sub-goals?	Try to keep the steps in an indefinite order	Use several open endpoints.	Set time points with each of your steps	Set time gaps with each of your steps		C
	Advanced	In line with hope theory, when are performance gains achieved?	When goals are internalized	When goal achievement is controlled externally	When goals are formulated in an avoidance framework	When goals are committed to	When goal achievement is self-regulated.	A, D, E
Self-efficacy	Basic	Which factors do influence self-efficacy?	Previous success	Work Environment	Modelling on others in the same situation	Arousal and positive emotions	Undergoing verbal persuasion	A, C, D, E
	Intermediate	Which of the following statements are correct?	People with high self-efficacy shy away from difficult tasks	People with high self-efficacy have high aspirations	People with low self-efficacy show high commitment to the goal they choose to pursue.	People with low self-efficacy set themselves easy goals	People with high self-efficacy set themselves challenging goals	B, D, E

[8] With regard to the PsyCap content of the quiz questions in the gamified online training, reference is made to Leitner (2018).

[9] Multiple answers to the quiz questions for the gamified online training were possible.

	Advanced	Which statements regarding Mastery experiences are correct?	It occurs when we try to do something but are not successful.	It is the most effective way of developing a strong sense of self-efficacy	It occurs when we try to do something and are successful.	It takes trying different and easy things	It takes trying different and difficult things	B, C, E
Resilience	Basic	What can you do to bounce back from negative events?	Balance negative emotions with positive ones	Take things personally	Do not assume that an obstacle in one area means a setback everywhere	Believe the disappointment will last forever	Recognize that everyone goes through painful times	A, C, E
	Intermediate	How can resilience be promoted?	Lower risk exposure	Manage positive emotions	Nurture a negative self-view	Block powerful protective systems	Boost resources and assets	A, B, E
	Advanced	Which statements regarding Resilience are true?	Resilience is about ordinary adaption	The more assets one person has, the better the results	Resilience is about extraordinary skills	Focuses on the positive aspects of individuals rather than deficits	The more risk factors one has, the better the results	A, B, D
Optimism	Basic	What do optimists do when they face adversity?	They let go problem-focused coping	They tend to lose the realities of the situation that they cannot control.	They try to relieve the negativity of their situation with humor	They tend to confront themselves with more passive reactions	They can be considered "approach copers"	**C, E**
	Intermediate	Which of the following strategies can boost optimism?	Appreciation for the present	The Best Possible Way	The Great Inner Self	Leniency for the past	The Best Possible Self	**A, D, E**
	Advanced	On which statements do pessimist rely on?	Pervasive	Productive	Personal	Positive	Permanent	**A, C, E**

Appendix E: Treasure Keys of Gamified Online Training (Study 1)[10]

PsyCap element	Level	Question	Correct Answer[11]
Hope	Basic	Hope consists of goals, pathways and _____.	agency
	Intermediate	An _____ framework means that your goal is something you are trying to get or achieve. If your goal is in an _____ framework, then you are always moving toward your goal.	approach
	Advanced	An _____ framework is to have the goal of trying to stay away from an object. The reason that _____ frameworks are less successful is because you can never fully succeed at not doing something.	avoidance
Self-efficacy	Basic	When used in the more applied domain of sports or business performance, self-efficacy is often called _____.	confidence
	Intermediate	Although self-efficacy is _____ - specific, there are numerous studies showing its positive impact in various workplace applications.	domain
	Advanced	_____ (founder of social cognitive theory) and others have demonstrated that self-efficacy can be developed through the opportunities to experience mastery/success, vicarious learning/modeling, social persuasion and positive feedback, and psychological and physiological arousal and well-being.	Bandura
Resilience	Basic	Resilience is one's ability to _____ back from a negative experience with "competent functioning".	bounce
	Intermediate	The greater people show optimistic attitudes and are able to effectively balance negative emotions with positive ones, the _____ his or her resilience.	greater
	Advanced	Resilient people perceive themselves as having control over their own life. They have what psychologists call an "Internal Locus of _____".	Control
Optimism	Basic	_____ tend to be confident about solving problems, are better able to cope with stress, and expect positive and desirable events in the future.	Optimists
	Intermediate	Pessimists tend to constantly have _____ thoughts, experience more distress and are convinced that undesirable events will happen.	negative
	Advanced	'_____ optimism' is a mental and emotional state that can be trained and cultivated by consciously challenging any negative self talk.	Learned

[10] The formulation of the treasure keys in the gamified online training is based on own development.

[11] The participants had to complete the sentences with the correct answer.

Appendix F: Descriptive Statistics Experimental Group 1 (high and low engaged)

Descriptive Statistics of all Variables from EG 1_high engaged and EG 1_low engaged for all Measurement Points

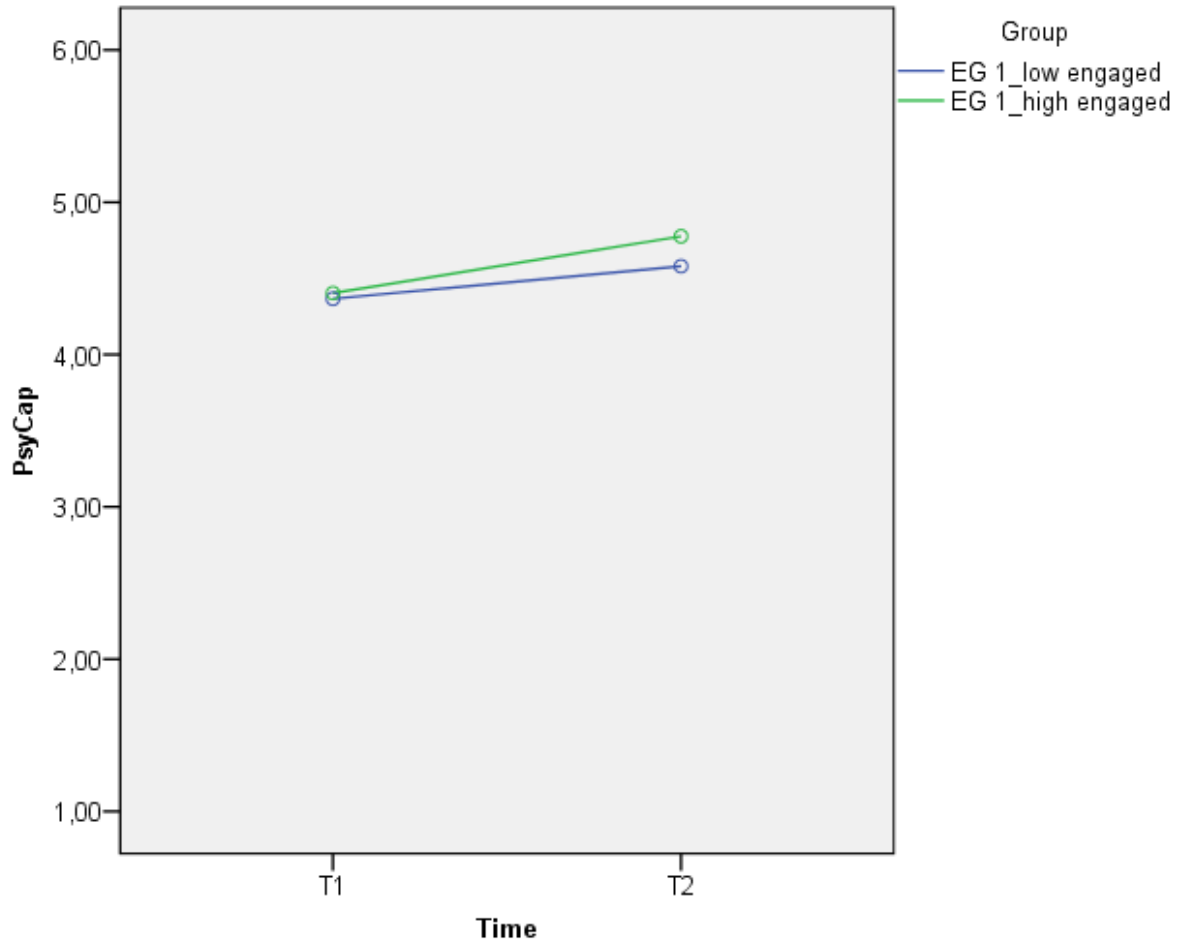
	Experimental group 1					
	EG 1_high engaged			EG 1_low engaged		
	M	SD	α	M	SD	α
Self-efficacy_T_1	4.37	.92	.841	4.38	.80	.808
Self-efficacy_T_2	4.68	.80	.851	4.65	.73	.729
Hope_T_1	4.44	.57	.806	4.39	.67	.741
Hope_T_2	4.87	.57	.791	4.63	.84	.880
Resilience_T_1	4.50	.61	.753	4.58	.53	.579
Resilience_T_2	4.82	.47	.619	4.80	.60	.662
Optimism_T_1	4.22	.65	.725	4.12	.68	.604
Optimism_T_2	4.70	.53	.530	4.28	.74	.732
PsyCap_T_1	4.38	.51	.876	4.37	.54	.876
PsyCap_T_2	4.76	.43	.852	4.60	.58	.896
Work Engagement_T_1	3.83	.80	.911	3.85	.97	.945
Work Engagement_T_2	4.24	.69	.899	4.06	1.00	.944
Job Satisfaction_T_1	3.93	.57	.808	3.75	.66	.624
Job Satisfaction_T_2	4.24	.50	.706	3.86	.86	.779
Organizational Commitment_T_1	3.87	.62	.695	3.84	.76	.769
Organizational Commitment_T_2	3.70	.48	.520	3.81	.74	.715

Note. EG 1_high engaged $T_{1 +} T_{2:}$ N = 21; EG 1_low engaged $T_{1 +} T_{2:}$ N = 36

Appendix G: Statistical Analysis of PsyCap and its Elements in high and low engaged Participants of the Gamified Online Training

Statistical Analysis of PsyCap in EG 1 high and low engaged

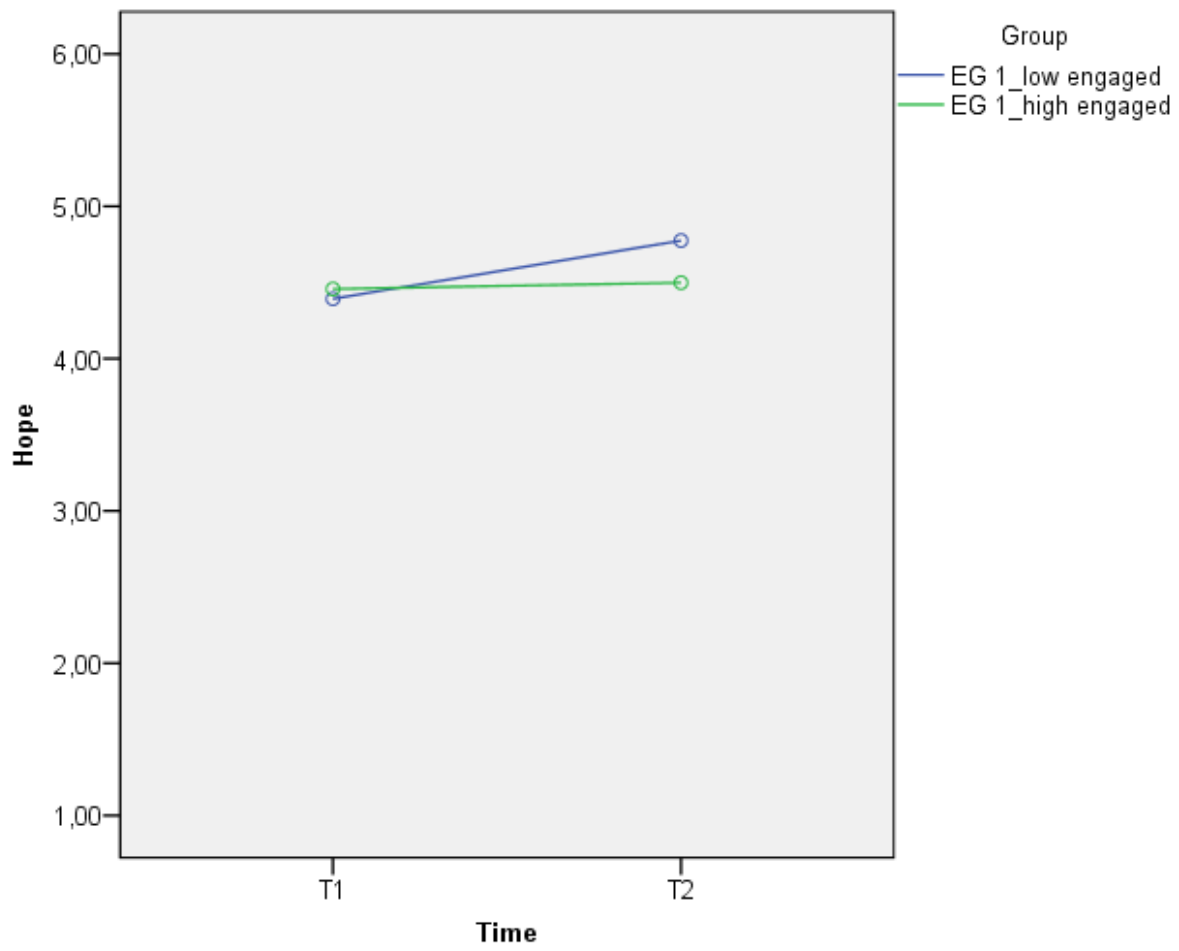
Source	F-value	df1	df2	Sig.	Partial Eta squared
PsyCap	.000	1	55	.987	.000
Group	.043	1	55	.837	.001
PsyCap * Group	.080	1	55	.778	.002
PsyCap * Gender	.113	1	55	.739	.002
PsyCap * Group * Gender	4.287	1	55	**.044**	.080
PsyCap * Age	.289	1	55	.593	.006
PsyCap * Group * Age	.084	1	55	.773	.002
PsyCap * Education	.669	1	55	.417	.013
PsyCap * Group * Education	2.713	1	55	.106	.052



Course in PsyCap for EG 1 high and low engaged

Statistical Analysis of Hope in EG 1 high and low engaged

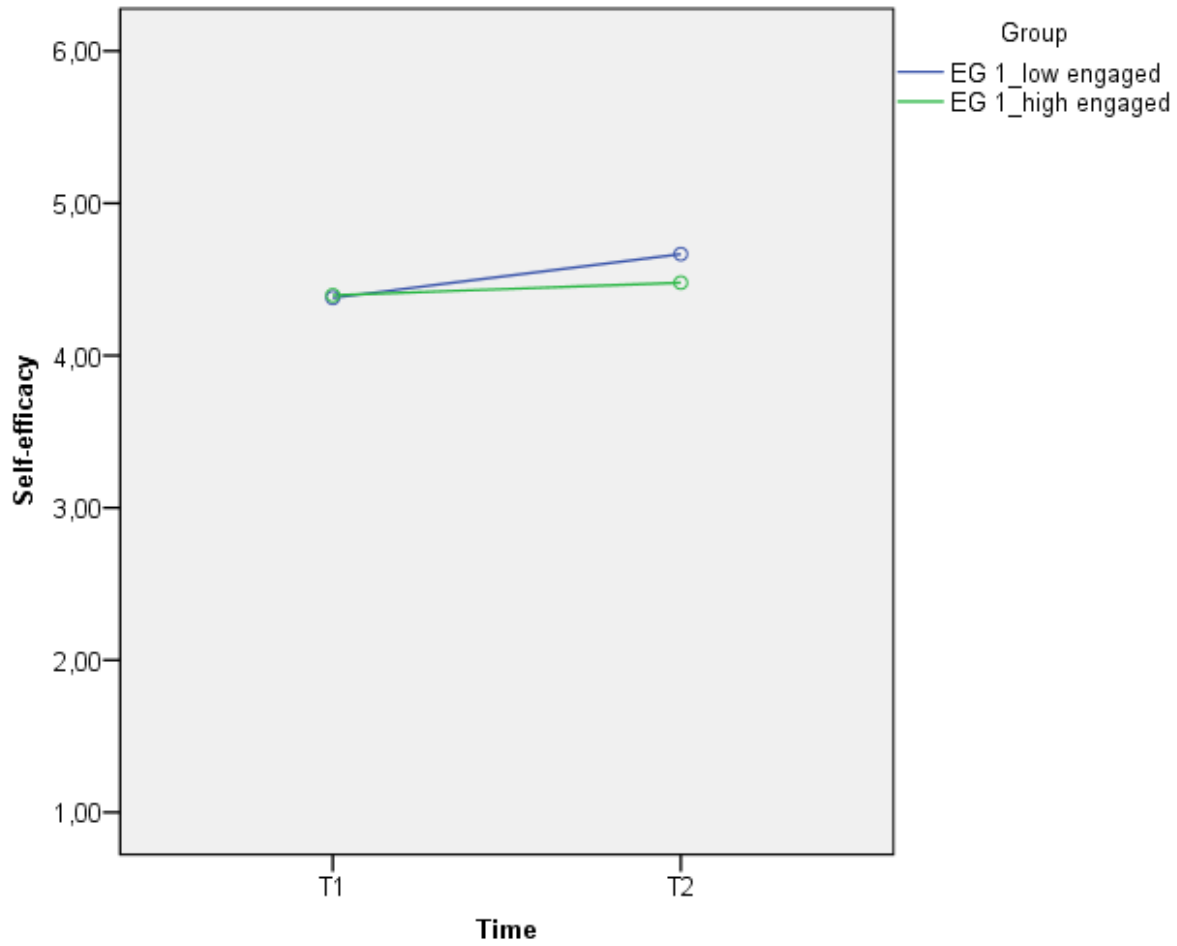
Source	F-value	df1	df2	Sig.	Partial Eta squared
Hope	.989	1	55	.325	.020
Group	.368	1	55	.547	.007
Hope * Group	.066	1	55	.799	.001
Hope * Gender	.270	1	55	.606	.005
Hope * Group * Gender	.207	1	55	.651	.004
Hope * Age	.335	1	55	.565	.007
Hope * Group * Age	1.814	1	55	.184	.036
Hope * Education	.187	1	55	.667	.004
Hope * Group * Education	.002	1	55	.965	.000



Course in Hope for EG 1 high and low engaged

Statistical Analysis of Self-efficacy in EG 1 high and low engaged

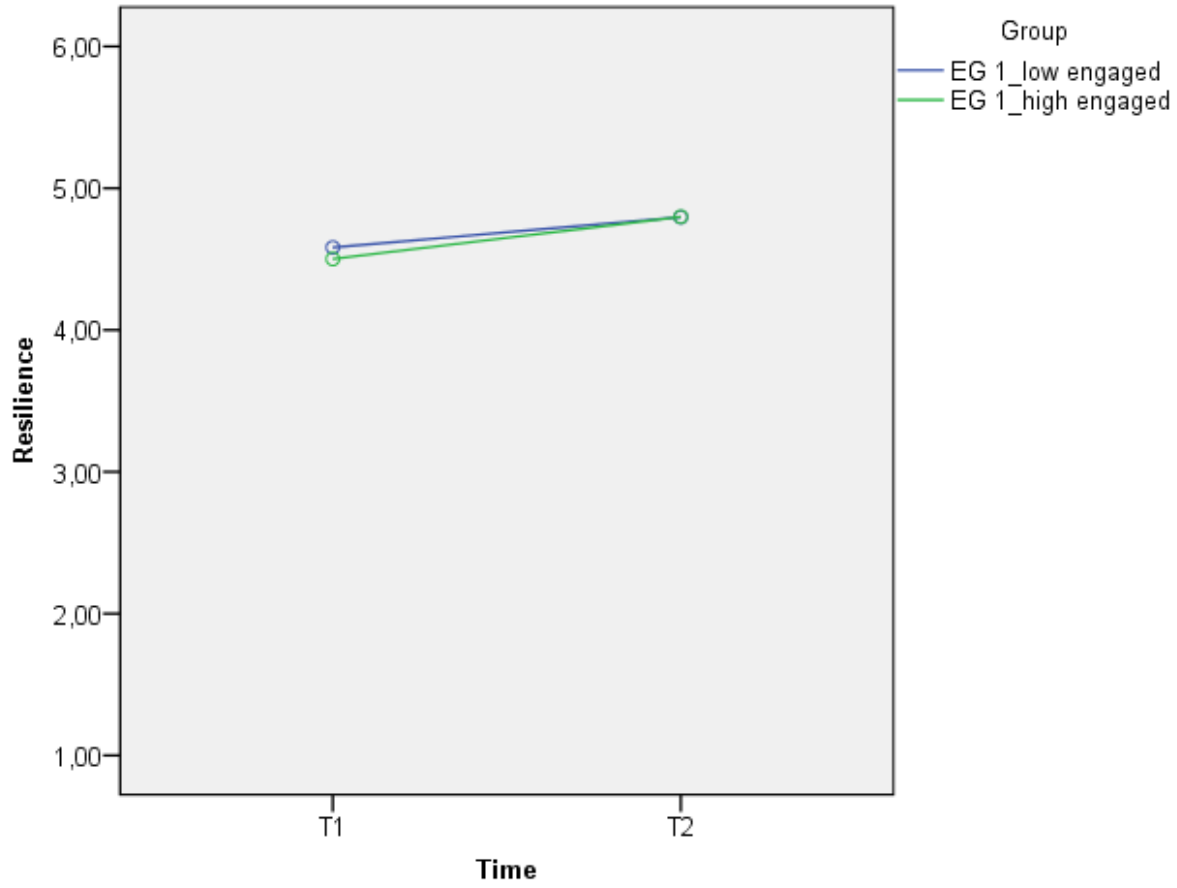
Source	F-value	df	df2	Sig.	Partial Eta squared
Self-efficacy	2.033	1	55	.160	.040
Group	.279	1	55	.600	.006
Self-efficacy * Group	.009	1	55	.923	.000
Self-efficacy * Gender	3.120	1	55	.084	.060
Self-efficacy * Group * Gender	1.417	1	55	.240	.028
Self-efficacy * Age	.062	1	55	.805	.001
Self-efficacy * Group * Age	.127	1	55	.724	.003
Self-efficacy * Education	.156	1	55	.695	.003
Self-efficacy * Group * Education	.567	1	55	.455	.011



Course in Self-efficacy for EG 1 high and low engaged

Statistical Analysis of Resilience in EG 1 high and low engaged

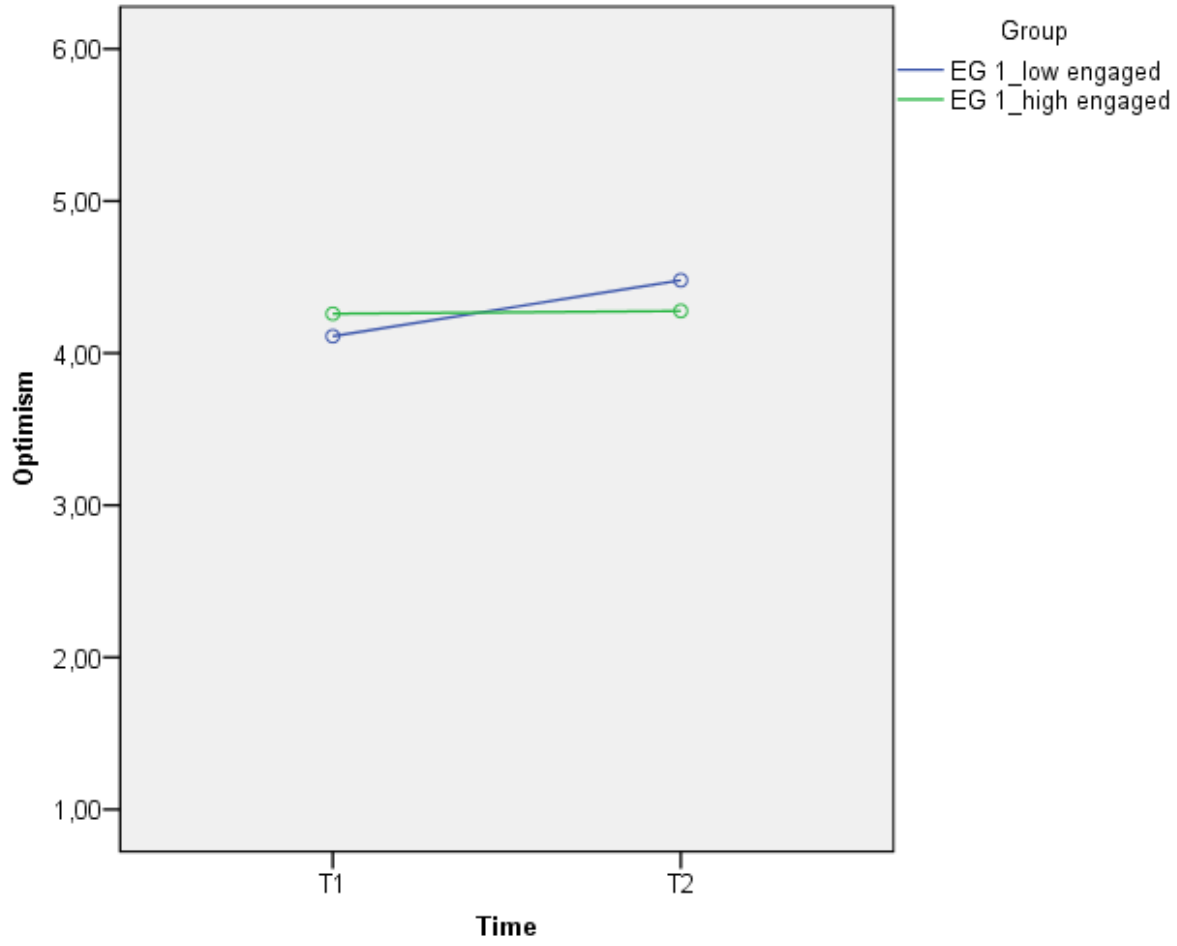
Source	F-value	df	df2	Sig.	Partial Eta squared
Resilience	.000	1	55	.983	.000
Group	.087	1	55	.769	.002
Resilience * Group	1.352	1	55	.251	.027
Resilience * Gender	.038	1	55	.847	.001
Resilience * Group * Gender	.100	1	55	.753	.002
Resilience * Age	.014	1	55	.905	.000
Resilience * Group * Age	.334	1	55	.566	.007
Resilience * Education	.162	1	55	.689	.003
Resilience * Group * Education	3.114	1	55	.084	.060



Course in Resilience for EG 1 high and low engaged

Statistical Analysis of Optimism in EG 1 high and low engaged

Source	F-value	df1	df2	Sig.	Partial Eta squared
Optimism	1.385	1	55	.245	.027
Group	.087	1	55	.769	.002
Optimism * Group	.027	1	55	.871	.001
Optimism * Gender	.668	1	55	.418	.013
Optimism * Group * Gender	1.182	1	55	.282	.024
Optimism * Age	.862	1	55	.358	.017
Optimism * Group * Age	.465	1	55	.498	.009
Optimism * Education	.812	1	55	.372	.016
Optimism * Group * Education	.001	1	55	.975	.000



Course in Optimism for EG 1 high and low engaged

Appendix H: Number of Stars awarded per Chapter in the Gamified Online Training (Study 1)[12]

	★	★★	★★★	★★★★	★★★★★	*N*	*M*	*SD*
HO_part 1of 3	6	8	26	27	14	81	3.43	1.12
HO_part 2of 3	0	3	7	7	9	26	3.85	1.05
HO_part 3 of 3	1	2	1	0	8	12	4.00	1.54
SE_part 1 of 3	3	7	12	15	4	41	3.24	1.10
SE_part 2 of 3	0	1	3	5	6	15	4.07	.96
SE_part 3 of 3	0	0	2	3	6	11	4.36	.81
RE_part 1 of 3	0	1	3	3	7	14	4.14	1.03
RE_part 2 of 3	1	2	3	2	5	13	3.62	1.40
RE_part 3 of 3	2	5	2	5	5	19	3.32	1.42
OP_part 1 of 3	1	4	10	2	5	22	3.27	1.16
OP_part 2 of 3	0	1	5	1	8	15	4.07	1.10
OP_part 3 of 3	0	0	5	2	6	13	4.08	.95

Note. 1 star: Participants do not like the training content at all 5 stars: participants like the training content a lot; HO = Hope; SE = Self-efficacy; RE = Resilience; OP = Optimism; *N* = Number of participants; *M* = Mean; *SD* = Standard deviation

[12] This is a detailed overview on the numbers of stars awarded per chapter from *all* participants who were registered on the gamified online platform and rated the respective chapters. Since the participants could not be filtered out of the chapter rating, more people are listed in the table than those who participated in the actual gamified online training.

Appendix I: Invitation Text of Classroom Training *Personal Resource Development* (Study 2)

DESCRIPTION

„It all begins and ends in your mind. What you give power to, has power over you, if you allow it."- Leon Brown.

Preparing for the future not only means upskilling yourself in latest technology trends but also taking care of your personal resources. And you already have what it takes within yourself, you just have to find the right keys to unlock your own power! Acquire techniques to develop essential mind skills that help you to enhance your workplace success including hope, self-efficacy, resilience, and optimism (HERO).

LEARNING CONTENT

Learning content comprises theoretical input as well as practical exercises, for example setting SMART work-related goals, generating pathways & overcoming obstacles, resource orientation, dealing with setbacks and identifying positive events at work.

TARGET GROUP

This course helps professionals of all areas and levels within the development organization to effectively frame and respond to workplace events with confidence and optimism.

PLEASE NOTE

The workshop will either be held in German or English. Participants are asked to complete an anonymous online survey before, directly after, and two months after having attended the workshop. This is important for the evaluation of the doctoral project. Are you eager to develop yourself further and grow personally? Then here is your chance to register for the workshop (limited capacity, nine workshop times available).

IMPORTANT

If you cannot attend, please unregister at least 48 hours prior to the event to allow other colleagues interested in the offering to participate. Thank you!

Appendix J: Handouts of Classroom Training (Study 2)

Exercise 1:

Managing Risk

Think about something that is happening to you right now at work (or in the past if nothing significant is going on now) that is not going as well as you had hoped. What is the situation?

_____
_____
_____
_____
_____

How are you currently responding? Do you feel: Defeated? Challenged? How can you frame the issue in terms of the real impact to you? What is the real risk to you?

_____
_____
_____
_____
_____
_____
_____

What control do you have over the situation? What are your options?

_____
_____
_____
_____
_____

Duration: 10 min

Discussion

Talk to your group member about the situation that you have identified and how you responded to each question. How did their view of their problem situations differ from your view of yours (i.e., risk, control, impact, options)?

_____
_____
_____
_____

What can you take away from this exercise that will help you to better frame your issue (i.e., assess/minimize/control the risk, identify options, etc.)? What can you do (what could you have done) differently? What have you learned about how others approach ‘risky situations’ in terms of how they perceived their risk, controlled it, dealt with the situation, developed strategies for overcoming the risk and following through, etc.?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Duration: 10 min

_____

Exercise 2:

Resource Engagement

Think about the same adverse event you examined in Exercise 1. What personal or other resources did you utilize to respond to the situation?

_____

_____

_____

_____

_____

It is important to be creative in identifying personal resources to help you bounce back from this adverse situation. What additional personal or other resources can you think of that can benefit or could have benefited you?

_____

_____

_____

_____

_____

Duration: 10 min

Discussion

Talk to your group member about each question in Exercise 2. How is he/she using personal or other resources? Did this discussion make you think of potential resources you had not considered?

_____

_____

_____

_____

What can you take away from this exercise that will help you engage more and better utilize personal or other resources to help you in the future or in this situation?

_____

_____

_____

_____

Duration: 10 min

Exercise 3:

List three of Your Goals in Your Current Position

(Consider your goals based on whatever is at the top of your mind and the most important to you today.)

- _____
_____
_____
- _____
_____
_____
- _____
_____
_____

Next, prioritize your goals and choose a goal you would like to work on.

-

Duration: 5 min

Exercise 4:

Rephrase Your Goal

Think about a concrete beginning and ending to your goal. What does success look like? Now re-write your goal with concrete endpoints:

Can you identify a short list of sub-goals or “mini” goals along the way to achieving your overall goal? List those sub-goals.

-
-
-
-
-
-

Duration: 10 min

Exercise 5:

Diagram Your Goal

What are the major skills/resources you will need to accomplish this goal?

- _____
- _____
- _____
- _____
- _____
- _____

Duration: 10 min

Exercise 6:

Overcoming Obstacles

List the top three potential obstacles to achieving your goal. Consider which are and which are not in your control:

1._____
_____
_____
Under my control □ yes □ no

2._____
_____
_____
Under my control □ yes □ no

3._____
_____
_____
Under my control □ yes □ no

How will you deal with those obstacles when they come up? Can you think of any ways around them?
1._____
_____
_____
2._____
_____
_____
3._____
_____
_____

Duration: 10 min

Appendix K: Invitation Text of Online Survey of Control Groups 1 and 2

Dear colleagues,
preparing for the future not only means upskilling yourself in latest technology trends, but also taking care of your personal resources. A colleague and I recently launched a new gamified online training called *HERO of the Jungle* as part of my doctoral research project. We are investigating specific resources that affect personal growth and workplace success.

For this scientific evaluation we need people from a comparison group to participate in the anonymous online survey (approx. 15 min). **The research is structured around three surveys which you will be asked to complete over the course of a 2-month period.**

IMPORTANT: Your e-mail address will be requested after having submitted the survey, so I can send you the follow-up surveys. The results will still be anonymous (data protection compliant). Without your e-mail, the questionnaire data cannot be evaluated.

Feel free to contact me if you have any questions.

Thank you very much for taking the time to fill in the online surveys and support this research. Your cooperation is highly appreciated.

Kind regards,
Maren Dewald, Doctoral candidate

Appendix L: Analysis of Drop-outs for all Variables and all Groups (EG 1, EG 2, CG 1, CG 2)

Group Statistics

	Group	N	Mean	Std. deviation	Std. error mean value
PsyCap_T1	EG 1 drop-out	204	4.51	.60	.04
	EG 1	57	4.37	.53	.07
JS_T1	EG 1 drop-out	204	3.99	.80	.06
	EG 1	57	3.82	.63	.08
WE_T1	EG 1 drop-out	204	3.99	.82	.06
	EG 1	57	3.84	.90	.12
OC_T1	EG 1 drop-out	204	4.40	.77	.05
	EG 1	57	3.85	.70	.09

Test on independent Samples for EG 1 and EG 1 drop-outs at T1

		Level test of variance equality		T-test for mean equality						
									95% Confidence interval of the difference	
		F	Sig.	t	df	Sig. (two-sided)	Mean difference	Std. error difference	Lower	Upper
PsyCap_T1	Variance equality assumed	1.117	.291	1.502	259	**.134**	.13104	.08725	-.04077	.30285
	Variance equality not assumed			1.612	99.852	.110	.13104	.08132	-.03029	.29237
JS_T1	Variance equality assumed	1.089	.298	1.511	259	**.132**	.17148	.11351	-.05203	.39499
	Variance equality not assumed			1.713	110.005	.090	.17148	.10010	-.02689	.36985
WE_T1	Variance equality assumed	.826	.364	1.226	259	**.221**	.15349	.12515	-.09296	.39993
	Variance equality not assumed			1.161	83.479	.249	.15349	.13225	-.10953	.41650
OC_T1	Variance equality assumed	2.732	.100	4.823	259	**.000**	.54641	.11328	.32333	.76948
	Variance equality not assumed			5.068	96.560	.000	.54641	.10781	.33243	.76038

Group Statistics

	Group	N	Mean	Std. deviation	Std. error mean value
PsyCap_T1	EG 2 drop-out	20	4.41	.44	.10
	EG 2	113	4.23	.68	.06
JS_T1	EG 2 drop-out	20	3.92	.68	.15
	EG 2	113	3.74	.83	.08
WE_T1	EG 2 drop-out	20	3.80	.76	.17
	EG 2	113	3.53	.81	.08
OC_T1	EG 2 drop-out	20	4.20	.82	.18
	EG 2	113	4.17	.80	.07

Test on independent Samples for EG 2 and EG 2 drop-outs at T1

		Level test of variance equality		T-test for mean equality						
						Sig. (two-sided)	Mean difference	Std. error difference	95% Confidence interval of the difference	
		F	Sig.	t	df				Lower	Lower
PsyCap_T1	Variance equality assumed	3.207	.076	1.151	131	**.252**	.18278	.15875	-.13127	.49683
	Variance equality not assumed			1.544	37.141	.131	.18278	.11838	-.05704	.42260
JS_T1	Variance equality assumed	2.173	.143	.895	131	**.373**	.17625	.19696	-.21339	.56590
	Variance equality not assumed			1.027	29.938	.313	.17625	.17159	-.17420	.52671
WE_T1	Variance equality assumed	.235	.629	1.323	131	**.188**	.25706	.19424	-.12718	.64131
	Variance equality not assumed			1.379	27.120	.179	.25706	.18648	-.12548	.63961
OC_T1	Variance equality assumed	.025	.873	.130	130	**.897**	.02500	.19227	-.35538	.40538
	Variance equality not assumed			.126	25.609	.901	.02500	.19826	-.38283	.43283

Group Statistics

	Group	N	Mean	Std. deviation	Std. error mean value
PsyCap_T2	EG 2 drop-out	15	4.71	.61	.16
	EG 2	83	4.42	.70	.08
JS_T2	EG 2 drop-out	15	3.78	.87	.22
	EG 2	83	3.83	.77	.08
WE_T2	EG 2 drop-out	15	3.70	.68	.18
	EG 2	83	3.67	.90	.10
OC_T2	EG 2 drop-out	15	4.30	.80	.21
	EG 2	83	4.13	.85	.09

Test on independent Samples for EG 2 at T2

		Level test of variance equality		T-test for mean equality						
									95% Confidence interval of the difference	
		F	Sig.	t	df	Sig. (two-sided)	Mean difference	Std. error difference	Lower	Lower
PsyCap_T2	Variance equality assumed	.086	.770	1.495	96	**.138**	.28768	.19245	-.09433	.66970
	Variance equality not assumed			1.636	21.125	.117	.28768	.17582	-.07781	.65318
JS_T2	Variance equality assumed	.272	.603	-.243	96	**.808**	-.05355	.22017	-.49058	.38349
	Variance equality not assumed			-.223	18.176	.826	-.05355	.23994	-.55729	.45020
WE_T2	Variance equality assumed	2.419	.123	.102	96	**.919**	.02479	.24325	-.45806	.50764
	Variance equality not assumed			.123	23.708	.903	.02479	.20141	-.39117	.44075
OC_T2	Variance equality assumed	.022	.883	.715	96	**.476**	.16912	.23648	-.30029	.63854
	Variance equality not assumed			.748	20.198	.463	.16912	.22610	-.30221	.64045

Group Statistics

	Group	N	Mean	Std. deviation	Std. error mean value
PsyCap_T1	CG 1 drop-out	162	4.65	.58	.05
	CG 1	72	4.56	.60	.07
WE_T1	CG 1 drop-out	162	4.11	.70	.06
	CG 1	72	3.90	.77	.10
JS_T1	CG 1 drop-out	162	4.04	.80	.06
	CG 1	72	3.81	1.01	.12
OC_T1	CG 1 drop-out	162	4.40	.86	.07
	CG 1	72	4.21	.84	.10

Test on independent Samples for CG 1 at T1

		Level test of variance equality		T-test for mean equality						
									95% Confidence interval of the difference	
		F	Sig.	t	df	Sig. (two-sided)	Mean difference	Std. error difference	Lower	Oberer
PsyCap_T1	Variance equality assumed	.006	.938	1.043	232	**.298**	.08616	.08258	-.07654	.24886
	Variance equality not assumed			1.028	131.506	.306	.08616	.08385	-.07971	.25203
WE_T1	Variance equality assumed	1.171	.280	2.068	232	**.040**	.21121	.10212	.01000	.41242
	Variance equality not assumed			1.999	126.083	.048	.21121	.10564	.00215	.42028
JS_T2	Variance equality assumed	8.064	.005	1.931	232	**.055**	.23560	.12200	-.00477	.47596
	Variance equality not assumed			1.753	110.527	.082	.23560	.13437	-.03067	.50186
OC_T2	Variance equality assumed	.282	.596	1.465	232	**.144**	.17713	.12087	-.06102	.41528
	Variance equality not assumed			1.480	139.515	.141	.17713	.11968	-.05949	.41375

Group Statistics

	Group	N	Mean	Std. deviation	Std. error mean value
PsyCap_T2	CG 2 drop out	19	4.26	.87	.20
	CG 2	38	4.70	.57	.09
JS_T2	CG 2 drop out	19	3.75	.91	.21
	CG 2	38	4.06	.88	.14
WE_T2	CG 2 drop out	19	3.72	1.00	.23
	CG 2	38	4.06	.73	.12
OC_T2	CG 2 drop out	19	4.18	.80	.18
	CG 2	38	4.19	.97	.16

Test on independent Samples for CG 2 at T2

		Level test of variance equality		T-test for mean equality						
									95% Confidence interval of the difference	
		F	Sig.	t	df	Sig. (two-sided)	Mean difference	Std. error difference	Lower	Oberer
PsyCap_T2	Variance equality assumed	4.087	.048	-2.235	55	**.029**	-.43092	.19279	-.81727	-.04457
	Variance equality not assumed			-1.953	26.066	.062	-.43092	.22066	-.88443	.02259
JS_T2	Variance equality assumed	.162	.689	-1.226	55	**.226**	-.30702	.25048	-.80900	.19496
	Variance equality not assumed			-1.214	35.207	.233	-.30702	.25290	-.82032	.20628
WE_T2	Variance equality assumed	2.591	.113	-1.473	55	**.146**	-.34298	.23284	-.80960	.12364
	Variance equality not assumed			-1.325	27.769	.196	-.34298	.25892	-.87355	.18759
OC_T2	Variance equality assumed	.249	.620	-.057	55	**.955**	-.01462	.25787	-.53140	.50216
	Variance equality not assumed			-.061	43.197	.952	-.01462	.24112	-.50082	.47158

Appendix M: Correlations of PsyCap and the three Subscales of organizational Commitment from Study 1 and 2 at all Measurement Points

Appendix M.1

Correlations of PsyCap and the three Subscales of organizational Commitment from Study 1 at T1 and T2

	1	2	3	4	5	6	7	8
1. PsyCap_T1	—							
2. ACS_T1	**.295****	—						
3. CCS_T1	**-.296***	.044	—					
4. NCS_T1	**.162***	**.522****	**.237****	—				
5. PsyCap_T2	.201*	-.081	**-.221****	-.021	—			
6. ACS_T2	.295**	**.449****	**-.187***	.162*	**.370****	—		
7. CCS_T2	-.019	-.005	.173	.000	**-.222****	.034	—	
8. NCS_T2	.091	**.168***	-.039	.134	.030	.418**	.252**	—

Note. * = $p < .05$; ** = $p < .01$; N =114; ACS = Affective commitment scale; CCS = Continuance commitment scale, NCS = Normative commitment scale

Appendix M.2

Correlations of PsyCap and the three Subscales of organizational Commitment from Study 2 at T1, T2, and T3

	1	2	3	4	5	6	7	8	9	10	11	12
1. PsyCap_T1	—											
2. ACS_T1	**.308****	—										
3. CCS_T1	**-.350****	.040	—									
4. NCS_T1	.127	**.615****	.111	—								
5. PsyCap_T2	.027	.019	**-**.111	-.013	—							
6. ACS_T2	.041	.019	.013	.045	**.418****	—						
7. CCS_T2	-.050	-.110	**.246****	-.096	**-.299****	.046	—					
8. NCS_T2	-.015	.028	.087	**.153***	.105	**.680****	.211**	—				
9. PsyCap_T3	.112	.046	-.074	-.019	**.669****	**.240****	**-.272****	.015	—			
10. ACS_T3	.124	**.155***	-.018	.134	.167*	**.337****	**-.180***	**.260****	**.439****	—		
11. CCS_T3	-.029	-.098	.027	-.024	**-.237****	-.094	**.377****	.012	**-.307****	.006	—	
12. NCS_T3	.029	**.175***	-.036	.211	.045	**.291****	-.015	**.527****	.122	**.614****	**.200***	—

Note. * = *p* < *.05;* ** = p < .01; *N* =114; ACS = Affective commitment scale; CCS = Continuance commitment scale, NCS = Normative commitment scale

Appendix N: Multiple Regression Analysis of PsyCap and Relevant Work-Related Variables for EG 1 and EG 2 at all Measurement Points

Appendix N.1

Influence of PsyCap on Work Engagement for EG 1 at T1

Variable	Unstandardized	Standardized	Std. Error
(Constant)	-.710		.795
Self-efficacy	.185	.172	.144
Hope	.719**	.502**	.211
Resilience	-.170	-.105	.218
Optimism	.324	.240	.162
R^2	.485		
Adjusted R^2	.446		
F(df = 4;52)	12.248***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Job Satisfaction for EG 1 at T1

Variable	Unstandardized	Standardized	Std. Error
(Constant)	1.580		.617
Self-efficacy	-.179	-.239	.112
Hope	.315	.314	.164
Resilience	-.065	-.057	.169
Optimism	.464**	.492**	.125
R^2	.368		
Adjusted R^2	.319		
F(4,52)	7.568***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Organizational Commitment for EG 1 at T1

Variable	Unstandardized	Standardized	Std. Error
(Constant)	5.003		.843
Self-efficacy	.015	.018	.153
Hope	.030	.027	.224
Resilience	-.093	-.073	.231
Optimism	-.223	-.211	.172
R^2	.056		
Adjusted R^2	-.017		
F(4,52)	.765		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Work Engagement for EG 1 at T2

Variable	Unstandardized	Standardized	Std. Error
(Constant)	-1.286		.750
Self-efficacy	.487**	.407**	.138
Hope	.324*	.273*	.151
Resilience	.020	.012	.176
Optimism	.341*	.266*	.136
R^2	.600		
Adjusted R^2	.569		
F(4,52)	19.462***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Job Satisfaction for EG 1 at T2

Variable	Unstandardized	Standardized	Std. Error
(Constant)	.904		.706
Self-efficacy	.085	.083	.130
Hope	.614***	.603***	.142
Resilience	-.284	-.202	.166
Optimism	.263*	.239*	.128
R^2	.518		
Adjusted R^2	.481		
F(4,52)	13.998***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Organizational Commitment for EG 1 at T2

Variable	Unstandardized	Standardized	Std. Error
(Constant)	5.432		.798
Self-efficacy	.124	.141	.147
Hope	.173	.199	.160
Resilience	-.445*	-.371*	.188
Optimism	-.206	-.220	.145
R^2	.153		
Adjusted R^2	.087		
F(4,52)	2.341		

*p < 0.05; **p < 0.01; ***p < 0.001

Appendix N.2

Influence of PsyCap on Work Engagement for EG 2 at T1

Variable	Unstandardized	Standardized	Std. Error
(Constant)	-.237		.426
Self-efficacy	.084	.089	.094
Hope	.088	.092	.123
Resilience	-.181	.149	.147
Optimism	.552***	.517***	.112
R^2	.548		
Adjusted R^2	.525		
F(4,78)	23.673***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Job Satisfaction for EG 2 at T1

Variable	Unstandardized	Standardized	Std. Error
(Constant)	.345		.436
Self-efficacy	.105	.111	.096
Hope	.242	.254	.126
Resilience	-.033	-.027	.151
Optimism	.511***	.480***	.115
R^2	.524		
Adjusted R^2	.500		
F(4,78)	21.481***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Organizational Commitment for EG 2 at T1

Variable	Unstandardized	Standardized	Std. Error
(Constant)	4.579		.571
Self-efficacy	-.199	-.223	.126
Hope	.371*	.410*	.165
Resilience	-.296	-.254	.197
Optimism	-.020	.020	.150
R^2	.088		
Adjusted R^2	.041		
F(4,78)	1.877		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Work Engagement for EG 2 at T2

Variable	Unstandardized	Standardized	Std. Error
(Constant)	-.626		.370
Self-efficacy	.107	-.093	.105
Hope	.497***	.487***	.119
Resilience	.324*	.256*	.136
Optimism	.262*	.232*	.121
R^2	.703		
Adjusted R^2	.687		
F(4,78)	46.053***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Job Satisfaction for EG 2 at T2

Variable	Unstandardized	Standardized	Std. Error
(Constant)	.673		.370
Self-efficacy	-.196	-.197	.105
Hope	.373**	.425**	.119
Resilience	.180	.166	.136
Optimism	.370**	.381**	.121
R^2	.598		
Adjusted R^2	.577		
F(4,78)	28.965***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Organizational Commitment for EG 2 at T2

Variable	Unstandardized	Standardized	Std. Error
(Constant)	3.936		.590
Self-efficacy	-.573	-520	.167
Hope	.068	.070	.189
Resilience	.271	.226	.271
Optimism	.305	.285	.192
R^2	.163		
Adjusted R^2	.120		
F(4,78)	3.804**		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Work Engagement for EG 2 at T3

Variable	Unstandardized	Standardized	Std. Error
(Constant)	.267		.445
Self-efficacy	-.112	-.103	.135
Hope	.491**	.481**	.168
Resilience	.032	.026	.162
Optimism	.398**	.371**	.127
R^2	.559		
Adjusted R^2	.536		
F(4,78)	24.669***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Job Satisfaction for EG 2 at T3

Variable	Unstandardized	Standardized	Std. Error
(Constant)	-.463		.336
Self-efficacy	.038	.037	.102
Hope	.534***	.548***	.127
Resilience	.204	.176	.122
Optimism	.161	.157	.096
R^2	.724		
Adjusted R^2	.710		
F(4,78)	51.221***		

*p < 0.05; **p < 0.01; ***p < 0.001

Influence of PsyCap on Organizational Commitment for EG 2 at T3

Variable	Unstandardized	Standardized	Std. Error
(Constant)	3.787		.639
Self-efficacy	-.407*	-376*	.193
Hope	.474	.465	.241
Resilience	.033	.027	.232
Optimism	-.027	-.026	.182
R^2	.084		
Adjusted R^2	.037		
F(4,78)	1.793		

*p < 0.05; **p < 0.01; ***p < 0.001

Declaration in accordance to § 8 (1) c) and d) of the doctoral degree regulation of the Faculty

UNIVERSITÄT HEIDELBERG
ZUKUNFT SEIT 1386

FAKULTÄT FÜR VERHALTENS- UND EMPIRISCHE KULTURWISSENSCHAFTEN

Promotionsausschuss der Fakultät für Verhaltens- und Empirische Kulturwissenschaften der Ruprecht-Karls-Universität Heidelberg
Doctoral Committee of the Faculty of Behavioural and Cultural Studies of Heidelberg University

Erklärung gemäß § 8 (1) c) der Promotionsordnung der Universität Heidelberg für die Fakultät für Verhaltens- und Empirische Kulturwissenschaften
Declaration in accordance to § 8 (1) c) of the doctoral degree regulation of Heidelberg University, Faculty of Behavioural and Cultural Studies

Ich erkläre, dass ich die vorgelegte Dissertation selbstständig angefertigt, nur die angegebenen Hilfsmittel benutzt und die Zitate gekennzeichnet habe.
I declare that I have made the submitted dissertation independently, using only the specified tools and have correctly marked all quotations.

Erklärung gemäß § 8 (1) d) der Promotionsordnung der Universität Heidelberg für die Fakultät für Verhaltens- und Empirische Kulturwissenschaften
Declaration in accordance to § 8 (1) d) of the doctoral degree regulation of Heidelberg University, Faculty of Behavioural and Cultural Studies

Ich erkläre, dass ich die vorgelegte Dissertation in dieser oder einer anderen Form nicht anderweitig als Prüfungsarbeit verwendet oder einer anderen Fakultät als Dissertation vorgelegt habe.
I declare that I did not use the submitted dissertation in this or any other form as an examination paper until now and that I did not submit it in another faculty.

Vorname Nachname
First name Family name
Maren Endres

Datum, Unterschrift
Date, Signature
27.12.2021, M. Endres