



Doctoral School of Regional and Business Administration Sciences

Miklós Szerdahelyi

Heroes, Highly Effective People and Self-directed Learners at the Workplace: Developing and Measuring Positive Organizational Behavior Resources

Doctoral dissertation

Supervisors:

Ted A. Paterson Oregon State University László Imre Komlósi Széchenyi István University



Miklós Szerdahelyi

Heroes, Highly Effective People and Self-directed Learners at the Workplace: Developing and Measuring Positive Organizational Behavior Resources

Doctoral dissertation

Supervisors:

Ted A. Paterson Oregon State University László Imre Komlósi Széchenyi István University

Győr 19st April 2022 Széchenyi István University

Author's Declaration

No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or other university or other institution of learning.

Furthermore, this dissertation contains no material previously written and/or published by another person, except where an appropriate acknowledgment is made in the form of bibliographical references.

Abstract

Abstract of the dissertation submitted by: Miklós Szerdahelyi for the degree of Doctor of Philosophy under the title: Heroes, Highly Effective People and Self-directed Learners at the Workplace: Developing and Measuring Positive Organizational Behavior Resources

Month and year of submission: April 2022

Positive organizational behavior (POB) constructs are (a) grounded in theory, (b) sound psychometrically, (c) related to the field of organizational behavior, (d) state-like that is open to development and (e) positively correlated to workplace outcome measures such as performance and satisfaction. In this dissertation the field of POB is expanded along these criteria based on observed gaps in the literature. Quantitative statistical methods are used for scale abridgement and construct validation, as well a new intervention method is proposed to develop positive resources. Analysis was conducted on large samples of working adult populations from China, United States, Germany and Hungary. Overall sample size is above 2000 participants. Applied quantitative methods included exploratory and confirmatory factor analysis, effect size and regression analysis as well as mediation analysis. The most important results of this dissertation include the PCQ-5 scale, a new intervention method that avails of the benefits of peer teaching specifically to develop PsyCap. Also, the Seven Habits corporate training is for the first time conceptualized scientifically with the help of self-determination theory and a 7Habits construct is developed.

Acknowledgements

I vividly remember the entrance exam for the SzEEDSM doctoral program. The discussion with the panel was about my topic of choice that I intended to study and research. Of course, back then I was driven rather by intentionality to get accepted than elaborated research interests. Therefore, the closing comments by professor Baracskai, that I was accepted into the program, but not because - rather in spite of - my research topic, felt liberating.

Then, for a time, I was in this limbo between research topics. My fascination with most of the subjects we learned about was an exciting state of path searching guided by several interests without there being an outstanding one. I was genuinely interested in many of my professors' topics, yet not convinced that any of those are for me. Throughout these years I was a sceptic felt forced to believe that one day a topic would cross my way and I will then know and recognize my research area.

I owe acknowledgement, therefore, to the leaders of my doctoral program: professors Baracskai, Vastag and Komlósi, who have encouraged me patiently and helped me by being always available for professional, procedural and also personal discussions. I am thankful to many of my instructors who really have given me insights in various fields. I encountered readiness to help when I needed it also from professor Tamás Martos from Szeged.

My research, however, was shaped most prominently by my very open and supportive Ph.D. supervisor, Dr. Ted A. Paterson from Oregon State University. Working with Ted was absolutely a gift for me because of his professional insight experience in academia. His openness to work together on my research is what made this dissertation possible.

Finally, but not least, I have but gratitude towards my family, my wife Réka and my kids: Barni, Hanna, Lilla, Berci and Ambrus. They were patient, supported me and made the circumstance right to follow this project through. I can't wait to give back to them in terms of time, support and insight.

Table of Contents

Introduction	
Research Area and Gaps in the Literature	9
Research Problems	14
List of included papers	
Positive Psychological Capital: Validation of the PCQ-5	
Abstract	
Introduction	
PsyCap Theory and Measurement	
Construction and Validation of PCQ-5	
Method	
Results	
Discussion	35
Theoretical Contributions	
Limitations	
Conclusions	39
Tables (PCQ-5)	40
Developing Psychological Capital through a Peer Teaching Intervention	
Abstract	
Introduction	
Literature Review and Development of Hypotheses	
The Psychology of Learning While Teaching	
Psychological Capital Interventions and Outcomes	
Method	
Sampling and Participants	
Intervention Design and Procedure	
Measures	
Results	53
Discussion	55
Limitations	
Conclusion	59

Tables (Peer Teaching)	60
The Positive Psychological Basis, Measurement and Outcomes of Covey's 7Habits	65
Abstract	65
Introduction	66
Literature and Hypotheses development	67
The 7Habits Construct	67
The psychological basis of the 7Habits – perspective from Self-Determination Theory	69
7Habits and increased psychological resources as outcomes	71
Method	72
Results	74
Construct Development of the 12 item 7Habits scale	74
Construct Validation with mediation models	76
7Habits outcomes	78
Discussion	80
Limitations and future directions	82
Conclusion	83
Covey's 7Habits and the Big Five Personality Traits: Cure for High Neuroticism?	84
Abstract	84
Literature Review and Hypotheses Development	84
The Big Five Personality Traits and the 7Habits	86
Method	87
Results	91
The Big Five Personality Traits and the 7Habits as a whole	91
The Big Five Personality Traits and the Privat Victory	91
The Big Five Personality Traits and the Public Victory	92
The Big Five Personality Traits and Habit 1: Be proactive	92
The Big Five Personality Traits and Habit 2: Begin with the end in mind	92
The Big Five Personality Traits and Habit 3: Put first things first	93
The Big Five Personality Traits and Habit 4: Think win-win	93
The Big Five Personality Traits and Habit 5: Seek first to understand then to be understood	93
The Big Five Personality Traits and Habit 6: Synergize with others	94
The Big Five Personality Traits and Habit 7: Sharpen the saw	94
Discussion	94
Limitations and Conclusions	96

Self-Directed Learning Readiness in Virtual Teams in Hungary	9
Abstract	
Introduction	9
Virtual Teams	9
Self-Directed Learning	
Self-Directed Learning theories	
SDL Measurements	
Fisher's SDLRSNE	
Method	
Data Collection	
Data Analysis	
Results	
Discussion	
Conclusions	
Summary and Future Research	
References	

Introduction

As it is often the case, the research in this dissertation is personal, if not in content, at least in its motivation and it was shaped not just by what I am interested in but also by what I was looking for. As explained in the section Acknowledgements, it took me quite some time to put the pieces together and finally realize what research topic I want to pursue. It was a long-awaited discovery for me to learn about positive organizational behavior (POB) (Luthans, 2002a) which is the science of positive psychology in the workplace and in organizations.

I was always drawn to psychological theories that explain human behavior, and my motivation was practical: to learn how one can use this knowledge to advance personally, how one can treat oneself better, how one can lead an authentically good life. I knew that psychology was part of this puzzle. I also knew that it was possible to learn and grow in this respect. I have experienced this growth most directly through a soft-skill training called the Seven Habits of Highly Effective People (Covey, 1989). Through good habits, better thinking, prioritization – I was promised – I could increase my work performance as well as my contentment in life outside the workplace. And I did. To some extent... It is work in progress - as we would say. However, systems of references are key for progress, and the Seven Habits is a quite holistic system of reference for how one should conduct oneself both professionally and in general. What I missed for quite some time, even when I was already enrolled in the SEEDS doctoral program, was the awareness that a segment of science is all about the practical applications of so called positive psychological resources, that is positive psychology which was formally founded by Seligman & Csikszentmihályi (2000), and that at the crossing of positive psychology and organizational behavior a specific set of research is focusing on the positive psychology in the workplace. This recent branch of science is called positive organizational behavior (POB) (Luthans, 2002a) and at its center is positive psychological capital (PsyCap in short) which is about the HERO in each of us who are striving to increase in Hope, Efficacy, Resilience and Optimism (Luthans et al., 2004).

In POB the fundamental tension that motivates research and its applications is within the person. Aiming high, wishing to improve self or – from an organizational point of view – the employee, looking for opportunities to increase human performance is the driving force which is set against everyday struggles and human imperfections. POB is far from being only descriptive of what is conducive of high human performance, it is prescriptive at its

core as it aims at improvement. Since positive organizational behavior is defined by Luthans 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" (Luthans, 2002b, p. 59), POB is highly practical in its orientation.

In fact, trainings and books or programs for personal development precede the science of POB. Organizations, in example, were applying the Seven Habits of Highly Effective People long before a branch of science was established to study human performance in relation to positive psychological resources within the organizational context. Therefore, research can flow from practice to theory or vice versa. In the case of the Seven Habits, allegedly effective training is to be brought into the realm of science through definitions, theorizing and measurements. Whereas PsyCap was first a theory within POB and then it was measured and trainings, so called PsyCap interventions were validated.

The research presented in my dissertation is covering many of the possible types of research within POB. There is measurement related scale development and scale abridgment, construct theorizing and the development of new constructs, intervention development and the measurements of its effectiveness. There is research flowing from practice to science as in the case of the two conference articles on the Seven Habits, and there is research flowing towards practice or applicability as in the case of the PsyCap scale abridgment to obtain a highly practical shorthand scale for PsyCap and the peer teaching PsyCap intervention advanced in the second paper.

Research Area and Gaps in the Literature

The Seven Habits of Highly Effective People book by Stephen Covey (1989) is a training about unlocking the human potential that is hidden in all of us and left unexploited to lesser or greater extent. We all can do more, we all can do better, we all can make better decisions, we all can have better relationships, we all can be happier. The basic insight of Covey was that more independent employees who know what they want, take responsibility and who fashion their own environment (see Habits 1, 2 and 3) are not just happier but also more productive and creative, therefore there is this fundamental win-win situation (see Habit 4) between the leaders and followers, employees and employers which creates this opportunity for management to foster the employees' independence through trainings and to move the

bottom line with better individual attitudes and habits. Within the framework of Covey, employees and employers are united in wishing to develop the personal independence and an integrative interdependence, thus the fulfilment of the employees.

The second fundamental insight of Covey was that there are no tricks, we cannot push buttons, no magic is known to increase and sustain personal effectiveness. Covey calls it the law of the harvest. The work must be done. You may be able to cheat at school, which is an artificial environment and get better grades, but you can never do that and sustain your increased yield when you work with nature like in the case of a harvest – or human personality and human relationships. Therefor what makes a difference in terms of effectiveness must be something that certain people do regularly, something that is part of their second nature, yet it cannot be something that is so fundamental as personality traits, because then there cannot be any improvement – hence, no management opportunity. Covey, action oriented as he was, thought best to frame his program around habits, that can be prescribed and performed. Mind you, each habit is embedded in a worldview change – a new way of thinking justifies each habit – but habits remain actionable even if one is not yet convinced of the underlying reasoning.

Covey was not a scientist himself and he didn't reference management or psychological theories in his book, it rather came to him from experience as well as a general readings of management literature of the past two centuries. Yet his insights in detail as well as at system level are remarkably fitting into positive psychology and positive organizational behavior. My interest was revolving around these questions about personal effectiveness, work performance, good workplace habits and human flourishment. This was my Ph.D. topic even before I knew the keywords or anything about the relevant fields of science.

Positive psychology is the broadest field in which it is worth conceptualizing this dissertation. Traditional psychology, as observed by Martin Seligman and Mihály Csikszentmihályi (2000), became too narrowly focused on the psychological ills of human beings at the exclusion of research in the positive psychological phenomena. Such a positive psychology was already called for by Abraham Maslow in 1954 when he wrote about the need of a science of human psychological wellbeing, leading to "potentialities, virtues, achievable aspirations, or full psychological height" (Maslow, 1954, p. 354). Positive psychology, however, became institutionalized only in the year 2000 by Martin Seligman and Mihály Csikszentmihályi (2000). Martin Seligman justified the existence of this new

field of positive psychology with the observation that by our strong focus to help people and to do damage control, psychology got hocked up on treating illness and no attention was dedicated to work with normal people without debilitating traumas to make them happier to help them flourish. Seligman calls explicitly for intervention or trainings to help personal growth, but he equally insists that the science should be exact: interventions should help people to activate or to access their positive psychological resources, the change in attitudes, emotions or habits should be measurable and significantly positive, in turn, these resources or positive psychological constructs should be grounded in theory as well as researched empirically with sound psychometric methods.

An excellent example of such a psychological resource or positive construct is optimism. Optimism is worth mentioning because most people don't conceive of it as scientific category and it is very widely used in discourse. Moreover, people can relate to it: some people equate it to naiveté or consider it an excess, i.e.: wishful thinking. Along the same reasoning some people consider optimism inferior to realism or pessimism. Few people know about the science of optimism, about its counter-intuitive yet logical definition and its positive relation to mental health, well-being and performance. Finally, optimism is one of the dimensions of the higher order PsyCap construct, which is the topic of the first two papers in my dissertation.

Seligman defines thus pessimists and optimists: "The defining characteristic of pessimists is that they tend to believe that bad events will last a long time, will undermine everything they do, and are their own fault. The optimists, who are confronted with the same hard knocks of this world, think about misfortune in the opposite way. They tend to believe that defeat is just a temporary setback or a challenge, that its causes are just confined to this one case." (Martin Seligman, 1991, p. 74.). Optimists, who consider the difficulties as temporary setbacks and attribute them to externalities experience significantly more wellbeing and have higher performance at work as their peers who consider setbacks as general and attribute them to internal causes, who would be considered pessimists. Beyond its positive association with well-being and performance, the positive resource of optimism is also one that can be developed through positive interventions as it is also alluded to by the title of the book of Seligman (Learned Optimism).

While positive psychology is general in its scope to increase human flourishing, positive organizational behavior is work-related and focuses on organizational settings and has the

final goal to increase human performance at work. In the foundational paper about POB (Luthans, 2002b) clear inclusion criteria are defined for positive resources. The 2007 paper that introduces and psychometrically validates the multi-dimensional positive psychological capital (PsyCap) core construct defines the POB criteria as follows: "In addition, to differentiate from other positive approaches reported in both the academic and practitioner literatures, the following criteria were set for including constructs in this definition of positive organizational behavior: (a) grounded in theory and research; (b) valid measurement; (c) relatively unique to the field of organizational behavior; (d) state-like and hence open to development and change as opposed to a fixed trait; and (e) have a positive impact on work-related individual-level performance and satisfaction." (Luthans et al., 2007, p. 542). Through the examples of PsyCap and the Seven Habits we can clearly see these principles at work.

PsyCap is unique to the field of POB, in fact it is its foundational and perhaps most general construct. PsyCap is grounded in theory insofar as it builds on existing positive resources (hope, optimism, resilience, efficacy) and Luthans and colleagues elaborate in detail their theory (Luthans et al., 2004) of a latent positive construct that is beyond its manifest measurable primary positive dimensions. PsyCap is measurable through the component resources and the higher order construct was demonstrated to be psychometrically sound (Luthans et al., 2007). Just like all its dimensions, PsyCap itself is also state like, that is, in contrast to trait like constructs, like the big five personality traits, which are not malleable, PsyCap is open to development through interventions. Finally, PsyCap is demonstrated to predict job satisfaction and performance to a greater extent than any of its component dimensions as per the meta-analysis of Avolio et al (2011).

The research that I present in this dissertation focuses on two aspects of PsyCap. First, its measurement. During the literature review on PsyCap, I discovered a gap in the literature, namely that nobody has yet developed a very short form of the PCQ-24, the standard 24 item PsyCap measurement tool. Very short forms are handy when researchers have only seconds or minutes to measure a construct due to external limitations posed by management or given the fact that multiple measures are administered, or perhaps internal factors like the intolerance or boredom of the participants, yet they want to have an accurate estimation of their construct of interest. Very short forms, where dimensions sometimes are measured with as little as one item, have obvious limitations: in the case of the PCQ-5, a five item PsyCap

measure, that I propose in the first paper in this dissertation in example it is not possible to evaluate the separate dimensions, only the global PsyCap measure is possible to assess accurately with this very short scale. Yet again, for most research in PsyCap this would be an acceptable compromise if it allows for more measures assessed, or more measurements taken, or more participants surveyed.

In my second paper presented in the dissertation, I focus on PsyCap development through a peer teaching intervention that I designed from the perspective of role theory and the perennial wisdom that "by teaching we learn". Peer teaching is known to positively impact learning (Cate & Durning, 2007), experiments show that learning to teach as opposed to learning to be tested results in superior understanding and more conceptual knowledge. The novelty, or the gap in the literature, in this paper is to apply peer teaching in a positive psychological context. In the experiment we were curious if peer teachers of PsyCap develop their PsyCap resource as a result of teaching about PsyCap. Therefore, only peer teachers' were surveyed, peer learners were not measured. By teaching PsyCap, participants, that is peer teachers, would of course learn intensely about PsyCap, but we didn't measure the participants' increase in knowledge, rather their levels of PsyCap. As per role theory, if somebody is placed in the teaching role, the responsibility felt about the material thought can give them the aura of the expert, which is felt internally, therefore, in the case of this PsyCap peer teaching intervention, peer teachers' levels of PsyCap are boosted not just by the extra knowledge acquired but also by the feeling that they are in a sense the experts of PsyCap who are trusted to teach others about how to develop this core positive psychological resource.

My third and fourth papers are related to the Seven Habits material. Here the starting point is Seven Habits body of knowledge available in Covey's book (1989) and in trainings. My work consists in analyzing it from the perspective of POB, that is, I work from what can be considered an existing corporate and managerial practice (the Seven Habits trainings) and I am looking for the scientific basis of the business success and I try to systemize the Seven Habits so that it can be understood and researched with the tools of positive psychology and positive organizational behavior.

The third paper takes Covey's framework of personal growth from dependence to independence and then further to a synergistic interdependence and analyses it through the well-known motivational theory called self-determination theory, in short SDT (Deci &

Ryan, 2000). SDT establishes three basic or fundamental psychological needs, namely autonomy, competence and relatedness. As per the analysis all seven of the Seven Habits are reinforcing one or more of these basic psychological needs helping their fulfilment thus leading to states of more motivation, increased well-being and performance. The same paper proceeds to develop a psychometrically sound short 7Habits measurement tool and construct that is analyzed with a series of regression and mediation analysis in relation to SDT.

The fourth paper, which continues the discussion of the Seven Habits, applies the previously proposed 7Habits construct and through a series of linear regressions establishes the relationships between each habit and each group of habits and the big five personality traits (extraversion, conscientiousness, agreeableness, openness and neuroticism). This is a further necessary step to understand the Sven Habits in relation to existing psychological theories and to establish its scientific foundations.

The fifth paper in this dissertation is related to the construct known as self-directed learning readiness (SDLR) (Fisher et al., 2001). In this study through a Hungarian sample of adults working in virtual teams we analyzed the SDLR construct thus far applied only in the realm of nursing education. Since the theory of SDLR allowed for generalization to other populations we were curious to apply it for a different yet relevant area. Since the SDLR measurement tools have varied also in the preceding literature we conducted a first a confirmatory analysis of the existing tools and then an explorative analysis to find develop a measurement tool that would work for the Hungarian adult population working in virtual teams. The series of factor analysis led to the nine item long SDLR9 scale which establishes the self-directed readiness as a higher order construct with three dimensions.

Research Problems

In this final section of the Introduction, I am going to provide all the hypothesis of the subsequent five papers and summarize the research problems and the findings.

The first article has the tile "Positive Psychological Capital: Validation of the PCQ-5". This paper is heavily psychometric in its nature and it aims at developing a very short PsyCap scale that would be the measure of choice if researchers want to gauge one's psychological capital in seconds. This would improve research efficiency as well as response rate. The PsyCap measure developed, the PCQ-5, was found to be valid across multiple samples of working adult populations (N = 1331 in total) from the following countries: United States,

China, Germany, and Hungary. In order to establish this validity the paper the following hypotheses were set.

Hypothesis 1: The PCQ-5 is a valid one-dimensional representation of the higher-order PsyCap construct behind the PCQ-24 that manifests the following psychometric qualities across samples: 1a) internal consistency reliability above .7; 1b) good fit for the single factor PsyCap model (CFI > .95, SRMR and RMSEA < .08); and 1c) correlation above .9 with the PCQ-24.

Hypothesis 2: The PCQ-5 and the PCQ-24 are aligned in their positive relationships to job performance, job satisfaction, organizational citizenship behaviors (OCBs), voice and helping behaviors, as well as in their negative relationship to counterproductive work behavior (CWBs) such that 2a) the difference of the correlations of the PCQ-24 and the PCQ-5 with each criterion variable is less than 0.1; and 2b) linear regression results between the PCQ-5 and each criterion variable are significant.

The results confirm internal consistency reliability and good fit for a single factor global PsyCap model across all samples, and the PCQ-5 predicts the required workplace outcomes. This short five-item measure will allow for novel ways of application for PsyCap researchers, on the other hand its breadth of content is obviously more limited compared to longer measures and it avails of no dimensionality insofar as it only captures the global PsyCap construct.

The second paper called "Developing Psychological Capital through a Peer Teaching Intervention" is discussing a pretest, posttest, and retest controlled trial experiment with the peer teaching method to increase the PsyCap of the peer teachers. Drawing from role theory it is predicted that a peer teaching intervention will significantly increase the peer teachers' psychological resources. A one-time brief teaching session about PsyCap results in real PsyCap increase that is significant even three weeks after the intervention. The intervention designed was so-to-say minimalist, that is it tested the effect of peer teaching on psychological resources with as little input and effort as it is reasonably possible. This on the one hand means that modest results are to be expected, second, that if this minimalist peer teaching intervention produces results, then more intense interventions with more initial input and more preparation and more teaching activity can be really powerful. In order to validate the proposed intervention method the following hypotheses were set. Hypothesis 1: The peer teaching PsyCap intervention will result in real PsyCap development: a) t-tests will show significant PsyCap increase both at Time 2 and Time 3 compared to Time 1; and ANCOVAs will confirm that the treatment condition predicts the PsyCap at Time 2 and Time 3 beyond to Time 1 PsyCap scores.

Hypothesis 2: The peer teaching PsyCap intervention will result in PsyCap development for the treatment group such that the effect size of the change will be d = 0.19 or greater, that is, its effect will be at least as much as that of the web-based PsyCap intervention (Luthans et al., 2008).

Hypothesis 3: The peer teaching PsyCap intervention will result in real job satisfaction increase for the treatment group: a) t-test will show a significant increase in job satisfaction at Time 3 compared to Time 1; b) the effect size of this change in job satisfaction will be beyond trivial in magnitude (>0.2); c) PsyCap at Time 2 will be positively associated with job satisfaction at 0Time 3 even after controlling for Time 1 PsyCap levels.

Results show that there is real PsyCap development occurring and that is significant even 3 weeks after the intervention. Effect sizes confirm that both PsyCap development and the subsequent job satisfaction development are non-trivial in magnitude. The peer teaching method therefore is effective to develop positive psychological resources despite the minimalist design. The peer teaching PsyCap intervention is recommended to be used as a stand-alone intervention or as a component in complex PsyCap interventions.

The third paper is entitled "The Positive Psychological Basis, Measurement and Outcomes of Covey's 7Habits" This is an attempt to explain the effectiveness a of corporate personal development training, the Seven Habit training, by means of work-related positive psychological constructs. Covey's 7Habits training program is explained in terms of Self-Determination Theory (SDT) which builds on the satisfaction of the basic needs of Autonomy, Competence and Relatedness. A psychometrically valid 7Habits measurement tool is validated and a study was conducted to test the relationships between the 7Habits construct and established measures such as SDT, PsyCap and Thriving at Work. The following hypotheses are set in the paper.

Hypothesis 1: Self-Determination Theory provides psychological explanation to why the 7Habits framework as described by Covey could be conducive to personal growth.

Hypothesis 2: A valid measurement tool can be developed from questionnaire items representing the 7Habits framework.

Hypothesis 3: The 7Habits will positively relate to basic need satisfaction at work (SDT, PsyCap and Thriving at Work.

Hypothesis 4: The 7Habits will positively relate to PsyCap and Thriving at Work even when controlled for the effect of SDT basic need satisfaction.

After a theoretical display how each of the Seven Habits foster basic need satisfaction prescribed by SDT in order to increase motivation, well-being and performance statistical evidence is proposed to supports the hypothesized relationships between the 7Habits construct and extant positive constructs. Moreover, with hierarchical regression analysis it is also established that the 7Habits construct is not superfluous in so far as it predicts positive resources above and beyond SDT.

The fourth paper is entitled "Covey's 7Habits and the Big Five Personality Traits: Cure for High Neuroticism?" As in the previous paper it was concluded that Covey's practical guide fits the tradition of positive psychology and a 7Habits construct was developed, in this article observe the 7Habits from the perspective of the Big Five Personality Traits. The approach is exploratory and it builds on a series of regression analysis, yet the following relationships were hypothesized.

Hypothesis 1: The 7Habits latent variable is positively related to Agreeableness, Conscientiousness and Openness while negatively related to Neuroticism.

Hypothesis 2: Private Victory and related Habits dominantly will be positively related to conscientiousness.

Hypothesis 3: Public Victory and related Habits dominantly will be positively related to Extraversion, Agreeableness and Openness.

Limitations and Conclusions

The 45 regression models revealed to a large extent what was predicted. In addition, it is interesting that Neuroticism a dominant predictor of the 7Habits and its components. The Seven Habits training may be most helpful to those who would like to compensate for low Conscientiousness and low Agreeableness and high Neuroticism.

The fifth article is entitled "Development of the SDLR9 Measurement Tool and Evidence for a Second Order Latent Construct of Self-Directed Learning Readiness in Virtual Teams in Hungary". No formal hypotheses have been formulated because our approach was exploratory. We were curious if based on our sample from Hungarian adults working in virtual teams any of the extant SDLR scales would return acceptable results in terms of factor analysis. None of them did, so we used exploratory factor analysis and confirmatory factor analysis to arrive at an SDLR scale that would give coherent results for all three factors. To our surprise a nine-item variation of the scale, 3 items for each factor, not only met the cut off criteria for good fit, but we found evidence that SDLR is a higher order construct with three underlining dimensions.

The five papers don't present a linear case for any final conclusion, they rather expand the field of POB based on observed gaps in the literature. A common theme through all papers is psychometric insofar as quantitative statistical methods are heavily made use of. As a result of this dissertation the literature about positive organizational behavior is enriched with a PCQ-5 scale, a new intervention method that avails of the benefits of peer teaching specifically worked out and tested to develop PsyCap, the Seven Habits corporate training is for the first time conceptualized scientifically within well-known motivational theory, namely self-determination theory, a 7Habits construct and measurement tool is developed and tested, its relationship is explored in relation to SDT, PsyCap, Thriving at work and the Big five personality traits, and the self-directed readiness construct is adopted for Hungarian adults working in virtual teams.

List of included papers

Positive Psychological Capital: Validation of the PCQ-5

Paper under resubmitted for 2nd peer review to Group and Organization Management Szerdahelyi, M., Paterson, T. A., Huang, L., Martos, T., Komlósi, L. (2022): *Positive Psychological Capital: Validation of the PCQ-5*

Developing Psychological Capital through a Peer Teaching Intervention

Paper under double-blind review at Applied Psychology: an International Review Szerdahelyi, M., Paterson, T. A., and Martos (2022): *Developing Psychological Capital through a Peer Teaching Intervention*

The Positive Psychological Basis, Measurement and Outcomes of Covey's 7Habits ESD Conference paper, Published: April 2020.

Szerdahelyi, M. & Komlósi, L. (2020): The Positive Psychological Basis, Measurement and Outcomes of Covey's 7Habits

Covey's 7Habits and the Big Five Personality Traits: Cure for High Neuroticism?

ESD Conference paper, Published: September 2020.

Szerdahelyi, M. & Komlósi, L. (2020): Covey's 7Habits and the Big Five Personality Traits: Cure for High Neuroticism?

Development of the SDLR9 Measurement Tool and Evidence for a Second Order Latent Construct of Self-Directed Learning Readiness in Virtual Teams in Hungary Working paper published by the SZEEDSM Doctoral School.

Kupa, K., Szerdahelyi, M.J. and Komlósi, L. I. (2022): Development of the SDLR9 Measurement Tool and Evidence for a Second Order Latent Construct of Self-Directed Learning Readiness in Virtual Teams in Hungary, to be published

Positive Psychological Capital: Validation of the PCQ-5

Paper under resubmitted for 2nd peer review at Group and Organization Management Szerdahelyi, M., Paterson, T. A., Huang, L., Martos, T., Komlósi, L. (2022): *Positive Psychological Capital: Validation of the PCQ-5*

Abstract

Positive psychological capital (PsyCap) is a key measure of workplace positivity, yet its organizational impact may be somewhat limited by current measurement practices. Given its state-like and malleable nature, organizations need accurate yet brief measures to allow for repeated measurement of PsyCap to assess the effectiveness of interventions. A very short PsyCap instrument, therefore, could be used in various ways by organizations to measure and track employee positivity, thus enabling management to make decisions with more insight. Similarly, for researchers, a much shorter scale could dramatically improve research efficiency and response rate, opening up new perspective in PsyCap research. In this paper initial evidence is provided for the validity of a short PsyCap measure across multiple samples of working adult populations (N = 1331 in total) from four different countries (United States, China, Germany, and Hungary). Consistent with prior research, we propose a five-item PsyCap measure, the PCQ-5, consisting of one item from the dimensions of self-efficacy, resilience and optimism and one item for each facet of the hope dimension (agency and pathways). The proposed PCQ-5 shows internal consistency reliability and good fit for a single factor global PsyCap model across all samples. Moreover, like the PCQ-24, the PCQ-5 predicts meaningful workplace outcomes such as job performance, job satisfaction, OCBs, voice and helping behaviors and it is negatively related to deviant behaviors like CWBs.

Introduction

Positive Psychological Capital (PsyCap) is a core construct of individual-level human strengths, flourishing, and work-related excellence, which consists of four primary dimensions: hope, self-efficacy, resilience, and optimism. The higher-order PsyCap construct, that represents a more fundamental conceptual level than its components, is a

strong predictor of several key organizational outcome measures such as job performance, employee satisfaction and organizational citizenship behaviors (Avey, Reichard, Luthans, Mhatre, 2011b; Newman, Ucbasaran, Zhu, Hirst, 2014). While PsyCap claims to be distinguished from management fads, popular positivity, pep talks and common corporate trainings by its evidence-based background rooted in scientific theory as well as empirical research (Luthans and Youssef-Morgan, 2017), we argue that its future impact may be limited somewhat by current measurement practices.

Since its introduction into the management literature, PsyCap has been described as a state-like resource, that is malleable and open to development through interventions (Luthans, Avey, Avolio, Norman & Combs, 2006) thus highlighting the need for repeated measurement. The most widely used PsyCap measurement tool, as confirmed by meta-analytical studies (Avey et al., 2011b and Newman et al., 2014), is the PCQ-24 developed by Luthans, Youssef and Avolio (2007b), although the abridged PCQ-12 (Avey, Avolio and Luthans, 2011a) is also available and seems to be favored in cross-cultural settings (Luthans & Youssef-Morgan, 2017). Both measurement instruments represent the four-dimensional higher-order PsyCap construct, with multiple items per dimension. However, the structure of the currently available measures comes at the cost of brevity. And yet, state-like constructs, such as PsyCap, must often be measured repeatedly to assess: (1) changes in PsyCap over time in relation to changes in the environment or other stimuli and (2) the effectiveness of organizational interventions, thus highlighting the need for brief measures.

First, PsyCap is subject to change as time passes and as a result of organizational dynamics or management decisions. The changing levels of PsyCap, in turn, impact employee job performance (Avey, Luthans, Smith and Palmer, 2010; Paterson, Luthans & Jeung, 2014; Peterson, Luthans, Avolio, Walumbwa and Zhang, 2011), therefore PsyCap can serve as a good indicator of the psychological impact of recent organizational events on employees. If organizational decision makers are able to quickly assess changes in workforce PsyCap they may be able to take necessary actions (communication, interventions, etc.) before job performance is negatively impacted. However, this type of "pulse" data collection would require more parsimonious measures than the standard measures of PsyCap, that, due to their length, are not ideal to assess trends and to test employee responses to specific organizational changes frequently.

Second, due to PsyCap's strong links to desirable organizational outcomes and the fact that is can be developed, it is also the target of organizational interventions. The key to its relevance is that relatively simple, short, and low-cost trainings are effective to increase participants PsyCap (Youssef-Morgan & Sundermann, 2014). The return on PsyCap interventions can be as high as 260%, as indicated by Luthans and colleagues (Luthans et al., 2006). Measuring the effect of PsyCap development programs adds value for organizations because it makes quantifying benefits and costs possible, thus aiding with decision-making about future interventions. However, intervention effects are often left unmeasured beyond a single follow-up because of the difficulties involved with longer questionnaires. Repeated measurements, such as pre-, post-, and subsequent to interventions are made easier and less costly (in terms of lost productivity) by short, concise measurements tools.

Beyond organizational benefits, a very short PsyCap inventory is also relevant for the field of PsyCap research. With the increasing popularity of experience sampling methodologies (ESM), especially relevant for constructs such as PsyCap that are expected to fluctuate frequently, extremely short measures are absolutely necessary to avoid participant fatigue and attrition. It is increasingly common for ESM studies to include single-item measures for unidimensional constructs and measures with a single item per dimension for multi-dimensional constructs (Fisher & To, 2012; van Hooff, Geurts, Kompier & Taris, 2007). Thus, a very short PsyCap measure would be key to opening up opportunities for implementing an ESM approach, which is consistent with PsyCap's state-like nature, within PsyCap research. To date very few PsyCap studies have utilized an ESM approach and we surmise that part of the reason for this is due to the length of the current measures in use (see Wijewardena, Härtel & Samaratunge, 2017, for one example).

Short scales are not only important as a matter of mere convenience, but they also make new kinds of research possible, as observed by Ziegler et al. (2014). Short and short measures open the possibility of highly complex research designs as well as to invert the process of research; that is, to discover first and theorize afterwards, rather than vice-versa, as is usually done. For example, the Academy of Management Discoveries (2019) was created for "exploratory research at the pre-theory stage of knowledge development, where it is premature to specify hypotheses, and which generates surprising findings likely to stimulate and guide further exploration and analysis". The complexity of such research, driven also by the increasing number of constructs and involved statistical methods, require more varied and larger data sets; therefore, shorter scales are often a necessity. As Schoenfeldt (1984) observed: "Many well-conceived research studies have never seen the light of day because of flawed measures" (p. 78). PsyCap being a central construct in positive organizational behavior is likely at the center of several organizationally relevant research questions that are perhaps too complex to tackle, at least initially, with longer measurement tools, thus a very short PsyCap inventory seems to be of theoretical and practical importance for future PsyCap research.

PsyCap Theory and Measurement

The idea of positive psychological capital (PsyCap) was born from the need to go beyond human and social capital, that is, to account for not just what you know and who you know, but also who you are at work in terms of your positive psychological resources (Luthans, F., Luthans, K., & Luthans, B., 2004). PsyCap was conceived from the beginning as a multidimensional construct building on previous research on positive resources that differentiate individuals in the workplace. Moreover, PsyCap has been theorized as a higher-order construct that represents a more fundamental conceptual level than its first-order dimensions. Psychometric evidence supporting the second-order construct was provided by Luthans, Avolio, Avey, and Norman (2007a) with four dimensions: self-efficacy, hope, resilience and optimism. The fact that the global PsyCap measure was superior at predicting job performance and job satisfaction than any of its components stressed the practical significance of the new higher-order positive psychological construct.

The four dimensions of PsyCap are theoretically and empirically distinct from each other, while at the same time they correlate, and together constitute PsyCap as a core positive psychological resource. Hope, for instance, is defined as a "positive motivational state that is based on an interactively derived sense of successful (a) agency (goal directed energy) and (b) pathways (planning to meet goals)" (Snyder, Irving and Anderson, 1991, p. 287). Resilience in positive organizational behavior is defined by Luthans (2002a, p. 702) as a "positive psychological capacity to rebound, to bounce back from adversity, uncertainty, conflict, failure". Self-efficacy is defined as an employee's positive belief "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 and Luthans 1998, p.

66). Finally, optimists, according to Luthans and colleagues (2007a), are "those who make internal, stable, and global attributions regarding positive events (e.g., task accomplishment) and those who attribute external, unstable, and specific reasons for negative events (e.g., a missed deadline)" (p. 557). These four distinct dimensions combine to form the global PsyCap construct such that the total is greater than the sum of its parts.

The PCQ-24, the 24-item psychological capital questionnaire, that comprises 6 items for each dimension was introduced in 2007 (Luthans et al., 2007b). The items were selected from preexisting self-efficacy, optimism, hope and resilience scales. The 6 items of the hope dimension were distributed equally between the two hope facets (agency and pathways) but in confirmatory factor analysis they were forced to load on a single hope factor. To date, the PCQ-24 is the standard measurement tool to assess psychological capital in the workplace, and as a higher-order construct, is usually operationalized in its global form and only rarely, usually in studies analyzing the construct, are dimensions looked at separately in terms of their relationship and outcomes.

The PCQ-12, which is an abbreviated form of the PCQ-24, is interesting for the purposes of this current study because it reveals how the original PsyCap theorists approached the dilemma that scale abridgement is bound to bring up in the case of the multidimensional PsyCap construct. The PCQ-12 was developed because of concerns about the length of the original PCQ-24 and it was first documented in two PsyCap studies (Luthans, Avey, Clapp-Smith & Li, 2008; Avey, Avolio and Luthans, 2011a). Since, however, the PCQ-12 has been widely used, and its application is recommended in international settings due to its brevity and because no reversed items were retained in this instrument (Luthans & Youssef-Morgan, 2017). During the scale abridgement process, Avey Avolio and Luthans kept the best 12 items, three per dimension on average, but optimism is represented by only two items in the PCQ-12 while hope is represented by four items: two items for the agency facet and two for the pathway facet. At the creation of the PCQ-12 the hope dimension, with its two internal facets, stood out among the other unidimensional PsyCap.

Typically, at least three items are required by factor analysis to measure a dimension, but according to the same logic three items may also measure a unidimensional global construct. In the case of PsyCap, because of its four well-established dimensions (hope, self-efficacy, resilience and optimism), theory would oblige any short measure to be composed of at least

four items, one for each dimension. However, hope, unlike the other PsyCap components, has its own subdimensions or facets well-established in the theory of PsyCap. With only one item representing the PsyCap dimensions, researchers would have to neglect one of the facets of hope, either agency or pathways, which is the same dilemma that Luthans and colleagues were confronted with at the development of the PCQ-12, and they chose to uphold both facets of hope and to represent them with an equal number of items. Building on these theoretical considerations and the precedent of the PCQ-12, in this study we propose a five-item PsyCap measure, the PCQ-5, that includes one item for both agency and pathways (hope), as well as one item for self-efficacy, resilience and optimism.

Construction and Validation of PCQ-5

Short versions of longer scales have been found useful and operative across several fields like personality (Rammstedt & John, 2007), management (Liden, Wayne, Meuser, Hu, Wu, Liao, 2015), developmental psychology (Geldhof, Bowers, Mueller, Napolitano, Schmid, Lerner, 2014; Putnam, Helbig, Gartstein, Rothbart, Leerkes, 2014; Putnam & Rothbart, 2006) education (Yan, 2020) and positive psychology (Russell & Daniels, 2018). Our endeavor to construct a very short PsyCap measure from the original item list of the PCQ-24 was guided by previous scholarly work on scale development (Hinkin, 1998) and scale abridgement (Smith et al., 2000; Stanton, Sinar, Balzer and Smith, 2002) as well as examples of successful short measures.

Smith et al. (2000) note two common errors in scale abridgement. First, items are either selected solely based on content validity leading to malfunctioning measurement tools, or second, selection is only based on psychometric considerations leading to scales that often measure only a narrow segment of the original construct due to the prevalence of the statistically best performing items. In order to avoid both extremes, we considered the steps proposed by Hinkin (1998) and Stanton et al. (2002) and robustly validated the new measure both in terms of content as well as psychometric validity. The steps of the scale abridgment process we followed are summarized in Figure 1.

Content validity, when developing short measures from the original item pool of an existing measure, is a somewhat more limited task compared to cases where researchers develop new items from scratch. In the special case of developing a short measure of an existing multidimensional construct, like in the present study, there may be further limiting

factors that predefine the measurement tool on theoretical grounds prior to psychometric analysis. On the one hand, the logic of very short measures leads to the shortest possible solutions; on the other hand, the number of dimensions in a multidimensional construct serves as a theoretical boundary below which the number of items included in the short measure cannot drop. According to Liden at al. (2015), the researchers' choice to include one item per dimension in a short measure is already an assurance that the new measure covers an essential proportion of the domain captured by the standard form. The previously described theoretical considerations about the PsyCap construct and the precedent of the PCQ-12 highlight the importance to include five items in the short measure (hence, the PCQ-5): one for each PsyCap dimension except for hope, which is represented by two items, one for each of its facets: agency and pathways. Following the approach of Liden et al. (2015), as a first step towards adequate content validity, we ensured that the full spectrum of dimensions and facets are covered in our short measure (Step 1). As an additional step, later in the process, we evaluated the breadth of content of individual items using some competing versions of the PCQ-5 based on psychometric results (Step 4).

The authoritative works of Smith et al. (2000), Hinkin (1998) and Stanton et al. (2002) show agreement in that confirmatory factor analysis and internal consistency are necessary for psychometrically valid scale development. Internal consistency reliability is a key issue for short measures because the reduced number of items is bound to result in diminished reliability (Cortina, 1993) so much so that low internal reliability could render short measures unviable. We used internal reliability as a way to narrow down the possible PCQ-5 item combinations and to select best candidates. Keeping in mind the restriction previously imposed on the process (in Step 1), to select all five items from different dimensions or facets, we analyzed all possible item combinations on all samples in terms of internal consistency. Item combinations with Cronbach's alpha lower than .7 on any samples were rejected as inadequate (Step 2).

Factor analysis is used in two ways during the creation of a short measure: (1) per Avey et al. (2011a), factor loadings of items can be considered based on data from the original PsyCap studies, and/or, (2) as in Liden et al. (2015) CFA can be computed for the short measure just identified as a confirmatory process. Arguably, the second approach is psychometrically more convincing and since we didn't have the data from the original PsyCap studies to evaluate item factor loadings, we resorted to CFA to evaluate our potential

versions of the short measure of PsyCap. The remaining PCQ-5 combinations (after Step 2), ordered by internal reliability, were used for confirmatory factor analysis: combinations with good fit for the single factor model retained (Step 3).

Our expectation with regards to the PCQ-5 is that its individual items each capture the core domain of the four dimensions (and two facets of hope) and that they together meaningfully represent the global PsyCap construct. We expect that the PCQ-5 will offer utility to researchers in need of a very brief measure as we theorize that it will be a representation of the PCQ-24 that meets the strict psychometric standards described in the literature including internal consistency reliability and construct validity.

Research Question 1: Is PCQ-5 a valid one-dimensional representation of the higherorder PsyCap construct behind the PCQ-24 and PCQ-12 according to the following psychometric qualities across samples: 1a) high internal consistency reliability; 1b) good fit for the single factor PsyCap model; and 1c) strong correlation with the PCQ-24 and PCQ-12?

Beyond internal consistency reliability and construct validity captured in RQ1, short measures should also manifest good criterion-related validity (Credé et al., 2012; Hinkin et al., 1998; Liden et al., 2015; Society for Industrial & Organizational Psychology (SIOP), 2003). We intend to provide such evidence by connecting the PCQ-5 to work-related outcomes belonging to the established nomological network of the PsyCap construct (Step 5, Figure 1). Since the PCQ-5 contains one item from each PsyCap dimension/facet and it represents the higher-order construct, we expect the PCQ-5 and the PCQ-24 to be strongly aligned in their correlations with the outcome measures.

Among the many PsyCap outcome measures included in the literature over the past 20 years, some stand out as more relevant than others in terms of positive organizational behavior. Job performance and job satisfaction have been the leading work-related outcomes for PsyCap from the beginning. In fact, Luthans and colleagues (2007a) originally justified the utility of the PsyCap construct by showing that it is a stronger predictor of job performance and job satisfaction than any of its components. In a meta-analysis of 51 samples (Avey et al., 2011b) PsyCap was found to predict self-rated, supervisor-rated, and objective performance as well as positive attitudes, such as job satisfaction. Arguably, job performance is the key outcome measure in positive organizational behavior because that is what many organizations ultimately prioritize. In fact, Luthans defines positive

organizational behavior (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" (Luthans, 2002b, p. 59). While performance is directly linked to the bottom line, sustained performance depends on the job satisfaction of the employees of an organization. The components of PsyCap like hope and optimism, but even resilience and efficacy, have rather obvious links to work-related satisfaction. In fact, job satisfaction is an outcome measure with which PsyCap has an even stronger positive relationship than with performance (Luthans et al., 2007a).

Meta-analytic findings (see Avey et al., 2011b and Avey, Luthans and Youssef-Morgan, 2010) point also to outcome variables such as organizational citizenship behaviors (OCBs) (Williams & Anderson, 1991), while an inverse relationship is reported between PsyCap and deviant behaviors like counterproductive work behaviors (CWBs) (Spector, Bauer, & Fox, 2010). OCBs include behaviors that are not part of the formal system of expectations in organizations, like helping colleagues to get up to speed or participating at non-mandatory events. Counterproductive work behaviors include deviant actions such as gossiping and talking bad about the organization or damaging equipment, stealing and bullying. OCBs and CWBs, although negatively correlated, are not two ends of a spectrum but rather two separate constructs with distinct outcomes; thus, employers have a stake not just in maximizing the former or minimizing the latter, but rather to do both. Empirical studies (Avey et al., 2011b) have found that positive employees are more likely to engage in OCBs and less likely to engage in CWBs, thus PsyCap, as a state-like resource that is open to development, can be an effective means to advance a desirable organizational culture.

Desirable behaviors that further enrich the organizational culture, like helping and voice behaviors (Van Dyne and LePine, 1998), are also among the PsyCap outcomes listed in the evidence-based assessment of PsyCap by Luthans and Youssef-Morgan (2017). Voice is defined by Van Dyne and LePine (1998) as a "promotive behavior that emphasizes expression of constructive challenge intended to improve rather than merely criticize" (p. 109), therefore employee voice is linked to the capability of an organization to sustain and develop positivity. Helping behaviors impact the culture of an organization through the mechanism described by social exchange theory, because helping behaviors tend to be reciprocated. Employee positivity captured by PsyCap is reported to be positively related to voice and helping behaviors (see: Luthans & Youssef-Morgan, 2017). In our study we rely

on all the above constructs as outcome variables to establish the criterion-related validity of the PCQ-5. We anticipate that the PCQ-5 will offer similar predictive abilities to the PCQ-24 in relation to both positive and negative outcome measures of PsyCap.

Research Question 2: Is PCQ-5 a similarly good predictor of job performance, job satisfaction, OCBs, voice and helping behaviors, as well as of the negatively related CWBs as PCQ-24 and PCQ-12 in terms of: (2a) their correlations with each criterion variable, and (2b) such that the linear regression results between PCQ-5 and each criterion variable are significant and similar in strength and rank order to PCQ-24 and PCQ-12 results?

PCQ-5 may be a valid representation of the PCQ-24 in terms of content and psychometric criteria and it may even provide similarly good predictive power, yet because its main advantage is its brevity, if its predictive power is not superior to each if the PsyCap dimensions, which are similar in length (6 items), the PCQ-5 will be limited in its usefulness. Therefore, we performed a usefulness analysis similar to what has been carried out for the PCQ-24 (Luthans et al., 2007a).

Research Question 3: Is PCQ-5 a superior predictor of job performance, job satisfaction, organizational citizenship behaviors (OCBs), voice and helping behaviors, as well as of negatively related counterproductive work behavior (CWBs) as the 6-item PsyCap dimensions of self-efficacy, hope, resilience and optimism?

Method

Our Step 1 (Figure 1) was to establish content validity for the one-dimensional PCQ short form representing the four-dimensional higher order PsyCap construct by predetermining that each dimension from PCQ-24 be represented by one item in the PCQ very short form (see Liden et al. (2015). As special theoretical consideration related to the PsyCap construct, following the precedent of Luthans et al. (2008) and Avey et al. (2011a) it was determined that both facets of hope be represented in our measure, hence the 5 item PCQ-5 measure with one item for its dimensions of self-efficacy, resilience and optimism and two for its hope dimension, one for each of its facets: agency and pathways. In the following sections we describe the development of the PCQ-5 and initial attempts at providing evidence for its validity. Having established the basic structure that the PCQ-5 would take, we then proceeded with steps 2 through 5 (see Figure 1), all of which required data from multiple samples.

Samples

In our effort to provide initial evidence for the validity of a very short PsyCap measure we followed the advice of Hinkin (1998), Smith et al. (2000) and Credé et al. (2012) to validate the PCQ-5 on multiple samples from multiple cultures globally to show that the measure proposed is applicable internationally. We obtained and collected samples from four countries (US, China, Germany and Hungary) representing a total of 1,331 working adults. Three samples were collected by the authors, however these samples include different criterion variables and diverse socio-demographic details as they were collected as part of larger research projects. The fourth sample, from Germany, is an open source PCQ-24 sample that includes no criterion variables. All samples were used to establish reliability and construct validities as captured in RQ1, but only the three original samples were used to test criterion-related validity, as only these included criterion variables. All samples. All samples contained the PCQ-24 (Luthans et al., 2007b) in official translation to the national languages. Standard 6-point Likert-type scales were applied (ranging from 1 = strongly disagree to 6 = strongly agree).

Sample 1: U.S. Working Adults

In order to test the psychometric validity of the PCQ-5, including reliability, factor structure, construct validity, and criterion-related validity, we collected data from 369 working adult US residents through Prolific. 367 (99%) provided usable data (two failed the attention checks and were excluded). Demographics of this sample are: 70% Caucasian, 8% African-American, 10% Latino or Hispanic, 9% Asian, 2% Two or More, 1% Other/Unknown and one person was Native American and one preferred not to say. 59% were male and 41% female, one person identified with neither. The average age was 34.82 years. The average time with their current employer was 5.9 years and the average time spent in their current position was 5.23. years. The highest level of completed education was reported as: 7% High School, 20% Bachelor's Degree, 47% Master's Degree, 21% Ph.D. or higher and 4% Trade School.

Sample 1 Measures. Participants completed the English original PCQ-24 (Luthans et al., 2007b), a subset of which contains the PCQ-5 (see Table 1 for the list of items). Cronbach's alphas for PCQ-24 and PCQ-5 are .93 and .83 respectively. Organizational citizenship behaviors (OCBs) and job performance were measured with the 14 and 7 item scales of Williams & Anderson (1991). Likert-type scales were applied ranging from 1 = strongly

disagree to 5 = strongly agree. Cronbach's alphas for OCBs and job performance are .80 and .82 respectively. Counterproductive work behaviors (CWBs) were measured with the 10item scale from Spector et al. (2010). Standard 5-point Likert-type scales were applied ranging from 1 to 5 with the following values: 1 =Never, 2 =Once or twice, 3 =Once or twice/month, 4 =Once or twice/week, 5 =Every day. Internal consistency reliability for CWBs scale is $\alpha = .82$. Measurement of job satisfaction was carried out using the 5-item scale from Judge, Locke Durham and Kluger (1998). Standard 7-point Likert-type scales were applied ranging from 1 =strongly disagree to 7 =strongly agree. Cronbach's alpha for job satisfaction is .9.

Sample 2: Chinese Working Adults

We collected data from participants working at large Chinese social media company to test the psychometric validity of the PCQ-5, including reliability, factor structure, and criterion-related validity. PsyCap was collected at Time 1 and the criterion-related variables were collected at Time 2 (approximately two weeks later). The invited participants worked in a number of job domains such as content creation, retail consumer relations, corporate consumer relations, social media marketing, and etc. The average age of the participants was 32.4 years, 56% were female and the average organizational tenure was 6.9 years.

Sample 2 Measures. PsyCap was measured with the Chinese version of the PCQ-24 a subset of which comprises the PCQ-5 (see Table 1 for the list of items) at Time 1. Cronbach's alphas for PCQ-24 and PCQ-5 are .98 and .92 respectively. Voice was measured with the 6-item scale from Van Dyne and LePine's (1998), while helping was measured with the 4-item short version used by Ng & Van Dyne (2005) of the helping scale developed by Van Dyne and LePine (1998) at Time 2. Cronbach's alphas for voice and helping respectively are .9 and .87.

Sample 3: German Working Adults

Internal reliability as well as construct validity of the PCQ-5 were tested on an open source German sample of 321 working adults (see Lorenz, Beer, Pütz and Heinitz, 2016). The PCQ-24 in this sample was used for construct validity at the construction of the Compound PsyCap scale, therefore no PsyCap outcome measures were available. We included this sample in our study to augment supporting evidence for RQ1. As reported in Lorenz et al. (2016), participants were recruited online, and the survey was conducted in

German. The average age of participants was 34.89 years, 60% were women and participants had been employed 7.91 years on average. 48% of the participants had university degree.

Sample 3 Measures. The German version of the PCQ-24 was administered to participants (see Lorenz et al., 2016) a subset of which composes the PCQ-5 (see Table 1 for the list of items). Cronbach's alphas for PCQ-24 and PCQ-5 are .92 and .78 respectively.

Sample 4: Hungarian Working Adults

For analysis relevant to RQ1 and RQ2 we collected data in Hungary from working adults for additional evidence of reliability, factor structure, construct validity, and criterion-related validity of the PCQ-5. Participants were gathered through flyer distribution, email lists and social media. Online answers were obtained from 260 participants. The average age was 38 years, 48% of the participants were female, and the average tenure was 4.56 years. Among the participants 64% had university degrees, 21% had PhDs, and 15% had high school or other degrees.

Sample 4 Measures. The Hungarian version of the PCQ-24 was used to measure PsyCap, a subset of which composes the PCQ-5 proposed in this paper (see Table 1 for the list of items). Cronbach's alphas for PCQ-24 and PCQ-5 are .93 and .8 respectively. Measurement of job satisfaction was carried out using the 5-item scale from Judge et al. (1998). Cronbach's alphas for job satisfaction in this sample is .84. Job performance was measured with 3 items of the Job subscale of Welbourne, Johnson, and Erez (1998). Reliability for job performance in the sample of Hungarian working adults is .8.

Item Selection

In Steps 2 and 3 we sought to identify the psychometrically valid PCQ-5 combinations that fit the basic content validity requirement to have all four dimensions and the two facets of hope included. Based on recommendations from Hinkin et al. (1998) and Stanton et al. (2002) we used first the tests of internal consistency then factor analysis to arrive at PCQ-5 combinations that satisfy the requirement defined in RQ1 across all samples. With only a few viable PCQ-5 options for consideration, we dedicated our attention to content validity with the hope to be able to identify the final version of the PCQ-5. We compared the psychometrically best performing combinations in terms of item content to increase breadth of domain beyond the simple criterion of having each dimension and facet represented (Step 4). For the dimensions of hope and optimism, items 10 (agency), 11 (pathways) and 22 (optimism) of the original PCQ-24 scale were among those included in the viable PCQ-5

combinations. All of these, in terms of content, represent the core of their respective factors. For self-efficacy, items 3 and 4 were included in viable PCQ-5 combinations. Both of these are strong items, in terms of content, capturing a broad segment of the self-efficacy construct, therefore no decision was based on these variations. As for resilience, items 14, 17 and 18 of the original PCQ-24 scale were included in the psychometrically sound PCQ-5 options. Among these we found significant difference as to how much they capture the "bouncing back from adversity" domain of the resilience dimension. Having reviewed the content of these items, we concluded that item 17 best represents the core of resilience while the other two items capture fewer aspects of the construct. Driven by the wish to maximize the content validity among psychometrically sound five-item combinations, we selected the PCQ-5 combination that includes items 3, 10, 11, 17 and 22 of the original PCQ-24 scale.

Criterion Validity

Subsequent to the item selection process, to establish the overall validity of the measure, the PCQ-5 was put to the test of criterion-related validity. In order to compare the criterion-related validity of the PCQ-5, PCQ-12, and PCQ-24 we computed correlations and linear regressions between the PsyCap measures and several PsyCap outcomes, namely job performance, job satisfaction, OCBs, CWBs, helping and voice. In addition, a usefulness analysis was run with multiple hierarchical regressions to determine if the PCQ-5, just like the PCQ-12 and PCQ-24 has additional predictive power over the PsyCap dimensions.

Results

We used four working adult samples from three continents and four countries for the analysis in this study. As indicated in the Methods section, only one of our four samples included data collected at multiple points in time, thus introducing the possibility of common methods bias. In order to investigate the degree to which this type of bias may have been evident in our datasets, we performed Harman's one-factor test (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). The exploratory factor analysis showed that total variance extracted by the single factors was less than 50% for all three of the samples where criterion variables are available. With concerns for common methods bias reduced, we proceeded with answering our research questions.

Related to RQ1, across all samples the PCQ-5 manifested good internal consistency reliability. Cronbach's alphas for the PCQ-24 were between .92 and .98, while for the PCQ-

5 estimates were between .78 and .92. While the standard threshold is .7 for internal consistency reliability, alpha for the PCQ-5 went below .8 only in the case of Sample 3 from Germany. Lower alpha values are typical at scale abridgement because alpha is a function of scale length (Cortina, 1993), thus alpha estimates are deflated for short measures compared to the full questionnaires. Our results based on the four samples in this study support an affirmative response to Research Question 1a and confirm the expected good internal consistency reliability for the PCQ-5.

Consistent with expectations related to RQ1b, confirmatory factor analysis conducted in R lavaan module (Rosseel, 2012) suggest that the unidimensional PCQ-5 representing the global PCQ-24 fits the data across the four samples. All fit indices for all samples conform to the cut-off criteria defined RQ1b indicating that the construct validity of the PCQ-5 is sustained across cultures and languages. CFA fit indices and factor loadings for all samples are available in Table 1.

Supporting the contention expressed in RQ1c that the PCQ-5 represents the global PsyCap construct, Pearson correlations between the PCQ-24 and the PCQ-5 scales were between .92 and .96 across the four samples. The results summarized in Table 1 support the hypothesized internal consistency reliability, factor structure and construct validity of the PCQ-5 measure. As additional analysis, comparative information about the PCQ-12 is also included in Table 1: Cronbach alphas and correlation with PCQ-5. PCQ-12 related results generally support the main findings for Research Question 1, namely that PCQ-5 is a valid unidimensional representation of the PsyCap construct.

Related to Research Question 2, we tested the criterion-related validity of the PCQ-5. Table 2 summarizes the correlations between the variables for each sample. The PCQ-24 and PCQ-5 correlation results with the criterion variables are aligned as required in RQ2 in that their differences are below 0.1. That is to say, the PCQ-5 is very close in predictive power to the PCQ-24. PCQ-12 results are mixed compared to the PCQ-5. The PCQ-12 is superior at predicting job performance in Sample 1 compared to PCQ-5, while in Sample 4 they are equal. PCQ-5 however is superior at predicting job satisfaction on both Samples 1 and 4. To go beyond correlations, we conducted linear regressions to assess the significance of the relationships between PsyCap measures and the outcomes. Results are summarized in Table 3. All relationships are significant at p < .001, moreover, when comparing the strengths of the predictive power of the PCQ-24 and the PCQ-5, we find that the PCQ-5

results closely approximate the PCQ-24 results, and a similar pattern of relationships emerge for both PsyCap measures, that is, the rank order of their outcomes is nearly the same: OCBs, satisfaction and performance are the most powerfully predicted outcomes for both PCQ-24 and PCQ-5. Thus, evidence is consistent with the expectations with regards to RQ2.

Research Question 3 proposes a usefulness analysis, which was modelled after Luthans et al. (2007), based on hierarchical regression analysis where PsyCap dimensions were regressed on the criterion variables and as a second step the PCQ-5 was added to see if it has additional predictive power over the similarly short constructs. Results show that self-efficacy is consistently overperformed by PCQ-5. Out of the eight instances of criterion variables across three samples hope is overperformed 5 times, resilience is overperformed seven times and optimism is overperformed six times by PCQ-5, therefore evidence supports an affirmative conclusion to RQ3. Caveats are that hope is the PsyCap dimension which has shown predictive power over the PCQ-5 three times for criterion variables such as CWBs (Sample 1), performance and satisfaction (Sample 4), and CWBs seem to escape the predictive edge of the PCQ-5 because three out of the four PsyCap dimensions predict it better than the PCQ-5.

Discussion

We proposed that in order to better reflect the state-like and malleable nature of PsyCap, organizations and researchers need access to a very brief measure of PsyCap in order to track changes over time. Based on previous scholarly work on scale development and scale abridgement (Smith et al., 2000; Hinkin, 1998; Stanton et al., 2002; and Liden et al., 2015) we took several steps (see Figure 1) to develop a short PsyCap measure that is both psychometrically valid and captures the content domain of the higher order PsyCap construct. In the current study we have provided robust support for the PCQ-5 scale which captures the higher-order PsyCap construct and is a unidimensional representation of the PCQ-24. Compared to the longer PsyCap scales, the clear advantage of the proposed 5-item scale is in its brevity while still measuring all four PsyCap dimensions and both facets of hope, thus it represents the core of the PsyCap construct with just five items. Of course, the PCQ-24 (Luthens et al., 2007b) or the PCQ-12 (Avey et al. 2011) which cover more ground in terms of breadth of content and are suitable to analyze the relationships between the

PsyCap dimensions. And yet, the PCQ-5 may be highly useful to track changes in PsyCap over time following organizational changes or interventions, in exploratory research alongside many other measures, or in ESM studies where measure length is a critical issue.

During the process of scale abridgement of the standard form PCQ-24, we took two steps to strengthen the content validity of the PCQ-5 (Step 1 and 4 of Figure 1). First, we determined on theoretical grounds that each PsyCap dimension and each facet of the hope dimension should be represented in the new inventory, thus the PCQ-5 consists of one item from the dimensions of self-efficacy, resilience and optimism and one item for each facet of the hope dimension (agency and pathways). Second, we evaluated the content validity of the psychometrically viable PCQ-5 candidates and selected the best item-combination in terms of breadth of content.

The psychometric analysis (Step 2, 3, and 5 of Figure 1), carried out on four samples from three continents and four languages, demonstrated internal consistency reliability, model fit for a single factor representing the global PsyCap construct, and high correlation with the PCQ-24 (Table 1). In addition, as recommended by Hinkin (1998), Smith et al., (2000) and Credé et al., (2012) we used three samples and seven outcome variables to verify the similarity between the nomological networks of the PCQ-5 and the PCQ-24 and to establish the criterion-related validity of the new 5-item measure (Table 2 and 3). Relationships and results of predictive capabilities confirm the adequacy of using the PCQ-5 as a representation of the global PsyCap construct if the relative loss in breadth of content and the absence of dimensionality are considered.

Further, to demonstrate the usefulness of the PCQ-5, above and beyond the original 6item PsyCap dimensions, we carried out hierarchical regressions with the criterion variables as outcomes to test the added value of the PCQ-5. Table 4 demonstrates that the PCQ-5 is more predictive of all the outcome variables (OCBs, performance, satisfaction, CWBs, voice and helping behaviors) than any of the PsyCap dimensions.

Theoretical Contributions

Positive psychological capital is a central construct in positive organizational behavior (Luthans, 2002a; Luthans et al., 2004), due to its state-like and developmental nature (Lupşa, Vîrga, Maricuţoiu and Rusu, 2020; Luthans et al., 2006) and strong relationship to positive workplace outcome measures above and beyond its component dimensions (Avey, Reichard,
Luthans, Mhatre, 2011b; Newman, Ucbasaran, Zhu, Hirst, 2014). Yet we argued that the impact of PsyCap may be limited somewhat by current measurement practices. As a state-like and malleable core positive psychological construct, PsyCap fluctuates as a result of changes within the person and in her environment. As such, PsyCap will need repeated measurement in order to reflect accurate current levels. However, the standard 24-item measure and its 12-item counterpart are sufficiently long to make it cumbersome to adequately gauge PsyCap variability. Thus, PsyCap may remain underutilized by organizations compared to its potential and researchers' insights about the causes and effects of PsyCap's fluctuation may remain elusive.

PsyCap, as with other multidimensional higher-order constructs (see: Linden et al., 2015), is most often operationalized in its global form to measure work-related positivity. However, measurement of the global PsyCap construct could be made significantly more efficient. Hence, we propose the PCQ-5, which is the unidimensional representation of the four dimensional higher-order PsyCap construct, in order to provide a more accessible measure of workplace positivity that is also suitable for repeated measurement, thus enabling further applications and investigations related to the malleable nature of PsyCap. The PCQ-5 makes it easy to measure and track work-related positivity, allowing management to obtain the "pulse" data of their organizations. PsyCap, as a malleable and state-like resource, is meant to be measured frequently allowing for the possibility to detect trends and helping management to evaluate decisions and events in the life of the organization that impact employee positivity.

As a result, the PCQ-5 will have theoretical implications for PsyCap research. First, because the PCQ-5 can be utilized in longitudinal and ESM studies where survey brevity is often a necessity, the degree to which PsyCap fluctuates over time can be adequately tracked. This is of significance to the theory of PsyCap because the construct has been conceptualized as state-like since its inception (Luthans et al., 2006). And yet, due to the length of current measures, longitudinal and ESM studies of PsyCap are scarce. With the PCQ-5, researchers will be able to establish the stability of PsyCap over time. In other words, how "state-like" PsyCap truly is can be empirically established. It is possible that PsyCap is more stable than initially hypothesized (i.e., more trait-like) or even more highly variable (i.e. a true state).

Second, the very short PCQ-5 will open up opportunities to better decipher the causal relationships between PsyCap and its correlates. As ESM, longitudinal, and repeated

measures study designs are made more accessible by the PCQ-5, the degree to which other constructs influence PsyCap, and how quickly these impacts are manifest, can be more accurately gauged. The same is true for PsyCap's influence on other important organizational outcomes. Thus, the PCQ-5 will open up opportunities for better identifying and specifying the causal chains in studies of PsyCap, thus refining our theoretical understanding of PsyCap.

Third, as observed by Ziegler et al. (2014), very short measures make new kinds of research possible: 1) highly complex research designs with multiple measures and multiple measurements and 2) studies where the process of research is inverted to theorize first and measure later. Exploratory research is essential to tap into organizational phenomena that are undetectable otherwise. As a result, these types of exploratory (i.e., "pre-theory") studies can be the genesis for theoretical breakthroughs.

Limitations

In this paper we provide initial evidence for the validity of a very short PsyCap measure, the PCQ-5. Based on results presented, the five-item measure represents the global PsyCap construct accurately in terms of domain of content and also meets psychometric standards across multiple samples of working adult populations (N = 1331 in total) from four different countries (United States, China, Germany, and Hungary). Moreover, the PCQ-5, similar to the PCQ-24, demonstrates stronger predictive power in relation to important work-related outcome measures, than any of the component dimensions of PsyCap. However, the limitations of the current study should also be considered.

The first set of potential limitations relate to the samples used to provide initial evidence for the validity of the PCQ-5. For example, because the four PsyCap samples used in this study have been collected independently by the researchers different socio-demographic data and criterion variables are available for each. Moreover, the samples are convenience samples with cross-sectional data. Convenience and cross-sectional samples also raise the question of common methods bias. Although one of our samples included data collected at multiple time points, we conducted Harman's single-factor test (Podsakoff et al., 2003) to assess the degree to which common methods bias may be a concern and we conclude that our samples are not heavily impacted. Finally, while the PCQ-5 is a reasonable one-dimensional representation of the PCQ-24, just like any other short measure it entails certain compromises. Despite strong content validity, a 5-item measure cannot capture the same breadth of content than the PCQ-24. Also, in this very short measure the dimensionality of PsyCap is dissolved in a global measure, thus limiting the possibilities of any analysis of the PsyCap construct involving its dimensions.

Conclusions

Overall, we recommend the PCQ-5 for use by organizations and researchers when measure brevity is critical. The PCQ-5 adequately captures the evidence-based PsyCap construct and, because of its brevity, is ideal for use in periodic employee surveys, to measure trends, or to assess how certain events in an organization affect employee positivity. Since PsyCap is strongly related to key workplace outcomes, PsyCap "pulse" data has high added value for management. The impact of organizational interventions is often left unmeasured due to the time and difficulty of repeated follow-up measurements. The PCQ-5 may provide an adequate solution to this problem. Moreover, the PCQ-5 will also be valuable for future PsyCap research. Very short measures are often a requirement for highly complex research designs, longitudinal research, and ESM studies. With the development and validation of the PCQ-5, we hope to advance the field of POB and to the applicability of PsyCap in organizational settings.

Tables (PCQ-5)

Table 1

Compar	15011 01 1	$1 \in \mathbb{Q}$ 5 and $1 \in \mathbb{Q}$ 24 psycholicult								
Item n	umber			CF	A standardize	rdized factor loadings ble Sample Sample 3 4 5 .550 .634 3 .754 .784				
PCQ-	PCQ-	_		Sample	Sample	Sample	Sample			
24	5		1		2	3 4	1			
3	1	Self-Efficacy item		.623	.835	.550	.634			
10	2	Hope item - agency facet		.813	.873	.754	.784			
		Hope item - pathways								
11	3	facet		.818	.836	.859	.775			
17	4	Resilience item		.603	.786	.510	.530			
22	5	Optimism item		.672	.819	.548	.612			
.93	.83	Sample 1 Cronbach alpha	CFI	.986	.999	.979	.988			
.98	.92	Sample 2 Cronbach alpha	SRMR	.025	.011	.036	.03			
.92	.78	Sample 3 Cronbach alpha	RMSEA	.072	.025	.075	.06			
				14.53	6.16	13.97	9.62			
.93	.08	Sample 4 Cronbach alpha	Chi-square (df)	(5)	(5)	(5)	(5)			
			Correlation between PCQ-5 and PCQ-							
			24	.919	.962	.926	.931			
NT	11 1			C 1	a a a		1 0			

Comparison of PCQ-5 and PCQ-24 psychometrics in Samples 1-4.

Note: All samples are from working adult population. Sample 1 = United States (N = 367); Sample 2 = China (N = 383); Sample 3 = Germany (N = 321); and Sample 4 = Hungary (N = 260). Correlation calculated between PCQ-24 and PCQ-5 within sample. Response scale: strongly disagree = 1; disagree = 2; slightly disagree = 3; slightly agree = 4; agree = 5; and strongly agree = 6.

Source: own research result

Table 2

4. OCD-1, and m-role	performance.								
	Measures	Mean	SD	1	2	3	4	5	6
Sample 1									
1	PCQ-24	109.34	15.87	(.93)					
2	PCQ-5	23.22	3.96	.92	(.83)				
3	OCBs	10.57	6.78	.62	.56	(.8)			
4	Job performance*	31.63	3.37	.52	.45	.60	(.82)		
5	Job satisfaction	24.85	6.96	.60	.59	.42	.31	(.9)	
6	CWBs	14.77	4.31	29	21	41	30	.34	(.82)
Sample 2									
1	PCQ-24	101.10	20.80	(.98)					
2	PCQ-5	20.96	4.58	.96	(.92)				
3	Voice	22.49	4.68	.38	.38	(.90)			
4	Helping	13.65	3.19	.38	.38	.44	(.87)		
Sample 3									
1	PCQ-24	108.35	13.65	(.92)					
2	PCQ-5	22.30	3.62	.93	(.78)				
Sample 4									
1	PCQ-24	110.14	15.99	(.93)					
2	PCQ-5	23.23	3.90	.93	(.8)				
3	Job performance*	14.43	2.38	.46	.45	(.84)			
4	Job satisfaction	23.74	4.48	.56	.56	.37	(.8)		

Means, standard deviations, Cronbach's alphas and correlations between PCQ-24, PCQ-5 and criterion measures for Samples 1-4. OCB-I, and in-role performance.

4Job satisfaction23.744.48.56.56.37(.8)Note: Internal consistency reliability is reported in parentesis on the diagonal. All samples are from working adult population.Sample 1 = United States (N = 367); Sample 2 = China (N = 383); Sample 3 = Germany (N = 321); and Sample 4 = Hungary (N

=260).

* The Job performance measures in Sample 1 and 4 are not the same: Williams & Anderson, 1991; and Welbourne et al., 1998 respectively.

Source: own research result

Table 3

Linear regression R square results for criterion variables of PCQ-24 and PCQ-5								
Samples	Sample	1			Sample	2	Sample 4	
Measure	OCB			CWB	Voic	Helpin		
S	S	Performance*	Satisfaction	S	e	g	Performance*	Satisfaction
PCQ-24	.386	.266	.355	081	.144	.141	.214	.311
PCQ-5	.314	.201	.351	045	.140	.147	.204	.316
Note: All 1	R square results	are significant at	p<.000. All sam	ples are from	n working adu	lt population	n. Sample $1 = $ United St	tates $(N = 367);$
0 1	2	China (N	202)		C	1	TT	$(\mathbf{N} \mathbf{I} \mathbf{O})$

Sample (N 383); Sample Hungary 2 =China =and 4 \equiv (N =260). * The Job performance measures in Sample 1 and 4 are not the same: Williams & Anderson, 1991; and Welbourne et al., 1998 respectively. Source: own research result

Developing Psychological Capital through a Peer Teaching Intervention

Paper under double-blind review at Applied Psychology: an International Review Szerdahelyi, M., Paterson, T. A., and Martos (2022): Developing Psychological

Capital through a Peer Teaching Intervention

Abstract

Drawing from role theory we predict that a peer teaching intervention in positive psychology will significantly impact the peer teachers' psychological resources. In an experimental study with working adult population, we explore whether a core work-related psychological resource such as psychological capital (PsyCap), that has been demonstrated to be developable through intervention, would increase as a result of a brief peer teaching activity. The results of the pretest, posttest, and retest controlled trial are consistent with our predictions: simple information about PsyCap paired with a one-time brief teaching activity results in real PsyCap increase that is maintained even three weeks after the intervention. Findings are relevant to the growing literature on work related positive psychology interventions in general as well to PsyCap literature.

Keywords: peer teaching; psychological capital; intervention; role theory

Introduction

"If you want to learn something, read about it. If you want to understand something, write about it. If you want to master something, teach it." — Yogi Bhajan

Psychological Capital (PsyCap) is at the intersection of positive psychology (Seligman & Csikszentmihalyi, 2000) and organizational behavior, in fact it occupies a central place in the field of positive organizational behavior (Luthans, 2002a, 2002b; Donaldson & Ko, 2010). PsyCap has been demonstrated to have a wide range of desirable organizational and individual outcomes ranging from creativity and engagement to organizational citizenship and job performance (Luthans, Carolyn and Youssef, 2017). Moreover, PsyCap has been

positioned as a state-like, and therefore malleable (open to improvement) psychological core resource, that is suitable for development in organizational situations through interventions. In the past 15 years several PsyCap interventions have been reported in the literature. Whereas the initial PsyCap intervention was relatively complex (moderated group session with multiple exercises), simpler versions have since been tried with success (for example: web-based video PsyCap intervention (Luthans, Avey, Patera, 2008) and structured reading PsyCap intervention (Zhang, Li, Ma, Hu, Jiang, 2014)). In the current study we set out to leverage the power of teaching and draw from role theory (Biddle, 1979) as well as the literature on peer teaching (Cate & Durning, 2007) to impact state-like positive psychological resources by placing participants in a position of responsibility and authority to teach PsyCap to their peers.

Mead (1934) was among the first to describe the power of "role taking" to shape human behavior. In the intervening years, a rich literature demonstrating the impact of role expectations has been established by some of the modern pioneers of social psychology (e.g., Katz & Kahn, 1966) and organizational psychology (e.g., Weick, 1979). We argue that the failure to harness the power of role expectations in the extant positive psychology interventions is a missed opportunity. In the current research we posit that by encouraging participants to take upon them the role of teacher, the level of learning and transformation through the intervention could be heightened versus interventions where the participants are taking a more passive role. In the current study we focus on peer teaching specifically, which following Cate and Durning we define "as an educational arrangement in which one student teaches one or more fellow students" (2007, p. 546). We explore the opportunity to consider peer teaching – mainly because of its benefits to the peer teacher based on the principle "by teaching we learn" – as an effective intervention type in positive organizational behavior.

By introducing an initial study that tests the efficacy of a PsyCap intervention that utilizes peer teaching to deepen the learning and transformation that participants undergo we intend to make several contributions to the literature. First, we intend to demonstrate through an experiment with PsyCap that a teaching activity in the realm of positive organizational behavior has measurable positive psychological impact. The present experiment with PsyCap is designed to test the peer teaching intervention method in its simplest form, yet with a complex subject matter. Both the minimalism of the design and the complexity of the teaching material help to look beyond this specific experiment and to evaluate the merits of the peer teaching method in general for positive organizational behavior. Second, we focus attention on effective PsyCap interventions that don't require trained facilitators and/or long online interventions to increase the accessibility of positive organizational behavior interventions for organizations (Mills, Fleck & Kozikowski., 2013). Third, we add to the relatively few (e.g., Zhang et al., 2014) PsyCap intervention studies that have demonstrated a sustained impact on PsyCap weeks after the completion of the intervention. And fourth, by utilizing a true longitudinal design (including three time points) we are able to not only demonstrate a sustained increase in PsyCap over time but that these increases in PsyCap are associated with predicted rises in important workplace well-being outcomes such as job satisfaction: a contribution that is called for in a recent meta-analysis on PsyCap interventions (Lupsa, Virga, Maricutoiu and Rusu, 2019).

Literature Review and Development of Hypotheses

The Psychology of Learning While Teaching

In this section we will develop a hypothesis, that through peer teaching (Cate & Durning, 2007) the changed role that the participants find themselves in, is psychologically positive (Biddle, 1979), and therefore that a peer teaching PsyCap intervention would increase participants engagement with the PsyCap material thus leading to significant PsyCap development. In accordance with our hypothesis, the literature on peer teaching implicitly highlights two basic dimensions of peer teaching in order to account for its benefits to the peer teacher. The first is related to the deeper learning of the material being taught: "As any teacher can report, there is nothing like learning through teaching. By having to explain something to someone else, one's attention is focused more sharply" (Riessman 1965, p. 30). The other dimension that accounts for the benefits of teaching to the peer teacher is associated with the role of relative authority that the peer teacher assumes independently of the material being explained. As Stahlbrand, and Armstrong (1984) formulate it, "a positive consequence of placing students in the teacher role is that they derive the psychological dividends of helping another person" (p. 3).

Whitman (1988) gives an elegant overview of the psychological benefits of peer teaching activities by dividing the psychological reasons why peer teaching is beneficial into cognitive and affective reasons. The cognitive difference between when we learn to teach as

opposed to when we learn to be tested is that in teaching there is typically a sequence occurring from the teacher's point of view: there is review, then the reorganization of the material, sometimes the reformulation of the knowledge, and finally the verbalization. All of this leads peer teachers to get to the "basic structure" of the subject (Gartner, Kohler, and Riessman, 1971).

Preparing for teaching, or simply studying, seem to make a significant difference in terms of learning outcomes as was observed by Bargh and Schul (1980). Participants who simply studied did worse on subsequent examinations than those who also participated in peer teaching sessions. When contrasting the experimental conditions of preparing for a test and preparing to teach the same material (without the actual teaching taking place), Benware and Deci (1984) found that at subsequent examination the experiment group did better in terms of conceptual understanding. When testing the three conditions together: simple (self-)learning, preparing to teach (without actual teaching) and preparation to teach with actual teaching, Annis (1983) found that self-learning was inferior to the preparation conditions, while those who went through the teaching experience on top of preparation did best at achievement tests.

According to role theory, not just feelings and beliefs lead to behaviors, but also viceversa, behaviors (according to different roles) can also lead to feelings and beliefs, thus entering the teacher's role may be beneficial in terms of how a person views herself as being competent and responsible in relation to the content of the teaching material. We expect that the peer teaching of a positive organizational behavior topic (PsyCap in our example) will lead not just to the deeper understanding of the material being thought, but also to a positive change in attitude driven jointly by the acquired knowledge and the personal stakes experienced when assuming the expert role.

Psychological Capital Interventions and Outcomes

Psychological capital was first proposed by Luthans and colleagues as a core positive psychological construct with four basic psychological resources including: hope, self-efficacy, resilience and optimism (Luthans, F., Luthans, K., & Luthans, B., 2004). From an organizational perspective, PsyCap has been demonstrated to be positively related to job performance and job satisfaction beyond the effect of its component resources (Luthans, Avolio, Avey, & Norman, 2007). The psychometric analysis justifying a higher order

PsyCap measure with four dimensions suggests that PsyCap may be an example where "the whole may be greater than the sum of its parts" (Dawkins, Martin, Scott & Sanderson, 2013, p. 350). The original PsyCap micro-intervention, which later became known simply as PsyCap intervention (PCI), was introduced by Luthans and colleagues in 2006 as a low cost, low effort, time efficient way to boost the bottom line of organizations (Luthans et al., 2006). The basic idea of the PsyCap intervention was to increase employee well-being and performance at work by doing something different from the common HRM practices which focused mostly on knowledge (human capital) or connectedness (social capital). Luthans and colleagues reported the results of the original PsyCap "micro-intervention" in terms of increased levels of participants' PsyCap and performance scores. The effect size of the statistically significant PsyCap increase was d = .4 for the pilot and d = .3 for the manager PsyCap treatment (Luthans, Avey, Avolio, & Peterson, 2010). The intervention itself was designed as a group training session with a duration of 2-3 hours. Methods were drawn from the preexisting literature of the PsyCap component resources of hope, self-efficacy, resilience and optimism. The technical solutions applied during the intervention included the role of the moderator informing participants about PsyCap, individual thinking and writing and group discussions (Luthans et al., 2004). A utility calculation done by Luthans et al. (2006) revealed a 270% return on such a PsyCap intervention the main costs being the facilitator and the time of the participants away from the job.

Other PsyCap intervention experiments have also come to the same conclusion regarding the state-like (developable) nature of PsyCap and its positive relationship to work-related outcomes, although the number of overall studies about PsyCap intervention is limited. A recent account of all PsyCap interventions is provided by Lupsa and colleagues, (2019) in their meta-analysis of controlled interventions. Table 1 (an extraction from the 2019 meta-analysis) summarizes the relevant interventions from our point of view: studies where the original work-related PsyCap was measured on working population and that have been published in peer-reviewed journals. Beyond the original PsyCap intervention paper by Luthans (2010), three more studies qualify: the web-based intervention by Luthans and colleagues (2008), the Bulgarian replication of the original PsyCap intervention (Dello Russo & Stoykova, 2015) and the structured reading intervention of Zhang et al. (2014).

The Dello Russo paper (2015) is worth mentioning because it is a reproduction of the original PsyCap intervention (Luthans et al., 2010) in a different international and cultural

setting, while the other two PsyCap interventions experimented with different intervention methods. In the case of the web-based video PsyCap intervention (Luthans et al., 2008) the impact was reported to be a small effect size d = .19 which is still not trivial in magnitude. In the other case, Zhang et al. (2014) tested a "structured reading" intervention in a randomized controlled study involving Chinese employees. The effect size of this intervention was (d=.28).

The peer teaching PsyCap intervention proposed in this paper needs to manifest similar qualities to the published interventions in order to qualify for the attention of researchers and practitioners as a valid method to develop PsyCap. Following the intervention analysis model of Luthans and colleagues (2010 and 2008), we conducted *t-tests* and *ANCOVAs* to determine whether the change in PsyCap is statistically significant and we calculated the Cohen's *d* to assess the effect size of the change. Our analysis, however, extends to 3 points in time, that is, we considered both the immediate and the longitudinal effect of the intervention.

Hypothesis 1: The peer teaching PsyCap intervention will result in real PsyCap development: a) t-tests will show significant PsyCap increase both at Time 2 and Time 3 compared to Time 1; and ANCOVAs will confirm that the treatment condition predicts the PsyCap at Time 2 and Time 3 beyond to Time 1 PsyCap scores.

Hypothesis 2: The peer teaching PsyCap intervention will result in PsyCap development for the treatment group such that the effect size of the change will be d = 0.19 or greater, that is, its effect will be at least as much as that of the web-based PsyCap intervention (Luthans et al., 2008).

From an organizational perspective, positive organizational behavior's main promise is that it's helpful to optimize human performance, well-being at work and job experience. Thus, positive organizational behavior essentially is "the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement" (Luthans, 2002b, p. 59). Luthans and colleagues (2007) demonstrated the criterion validity of the new higher order PsyCap construct by showing that job performance and job satisfaction are predicted by

PsyCap to a greater extent than by any of its components. Positive resources such as optimism (expecting good things to happen), resilience (the experience-based belief to be able to deal with difficulties) and hope and efficacy (feeling confident to act and find ways to succeed), understandably predict satisfaction and performance. But in PsyCap they seem to add up such that the sum is greater than its parts (Dawkins et al., 2013). The experimental study that proved that PsyCap is developable through interventions (Luthans et al., 2010) demonstrated the PsyCap intervention's positive effect on job performance as well. The meta-analysis on PsyCap interventions (Lupsa et al., 2019) provides support to the observation that the development of PsyCap can be translated into increased well-being, although meta-analytical findings are not clear because of the small number of studies.

For the purposes of this study we analyze the peer teaching intervention's effect on job satisfaction as a measure of work-related well-being. Because of the active learning occurring when teaching about PsyCap and its personal integration deepened by assuming the expert role in relation to this subject, we expect that PsyCap development will overflow into increased job satisfaction. PsyCap as a psychological resource, when developed, it becomes more accessible in work situations where hope, resilience, confidence and optimism are necessary, thus it will form participants' work-related attitudes subsequent to the intervention. In order to contribute to the literature on the PsyCap interventions' secondary outcomes, we will assess the increase of job satisfaction from pretest (T1) to retest (T3) levels, as well as the association of PsyCap development - from pretest (T1) to posttest (T2) - to retest (T3) job satisfaction levels.

Hypothesis 3: The peer teaching PsyCap intervention will result in real job satisfaction increase for the treatment group: a) t-test will show a significant increase in job satisfaction at Time 3 compared to Time 1; b) the effect size of this change in job satisfaction will be beyond trivial in magnitude (>0.2); c) PsyCap at Time 2 will be positively associated with job satisfaction at Time 3 even after controlling for Time 1 PsyCap levels.

Method

Sampling and Participants

We conducted a pretest, posttest, and retest randomized control group design with a heterogeneous sample of 127 working adults from a cross-section of industries. Participants were randomly distributed between the two experimental conditions, the respective sample sizes for the treatment and the control group are 63 and 64 participants respectively. Recruitment occurred through flyer distribution in public places, email lists and Facebook announcements to participate in "research on motivation". Respondents were instructed to go online and start by filling out the pretest questionnaire at the end of which they received instructions about the teaching task. Reminders were sent 3 days later to complete the teaching task and fill out the posttest questionnaire.

Pretest respondents were 440, 41% of whom dropped out. Among the rest 41 participants in total had to be excluded due to various reasons (22 participants failed at the manipulation checks or didn't complete the teaching task and 27 participants were not currently working). Retest questionnaire was completed by 49% of valid posttest participant, resulting in the final sample N=127. This sample of 127 participants was then subjected to analysis.

The final sample consisted of 45 people from management functions, 20 senior professionals, 54 mid- or low-level employees and 8 owned their own businesses. In terms of industry representation: 28 came from the education sector, 17 from the technology and 13 from the health sector, 10 from the financial sector and 8 from the production sector, 12 from the consumer goods, entertainment and commerce sectors, the remaining 39 people came from other sectors. As for organizational tenure, 31 participants have been with same organization for more than 10 years, 41 respondents reported organizational tenure between 3 to 10 years, and 55 have worked for their current employers for less than 3 years. In terms of education, the majority (68 people) hold Master's and Bachelor's degrees (27 people), 27 have PhDs, and 9 have high school or other degrees. The average age of the participants was 38.4 with a standard deviation of 9.2. Approximately half of the participants were female (48%) and 52% were male.

Intervention Design and Procedure

The two experimental conditions were designed to be identical with the only exception being the content of the teaching task. After completing the pretest questionnaire, participants were made aware of the teaching exercise required. Participants were informed that they would be asked to teach the contents of a brief document to a peer colleague or a friend of their choice. This teaching was not to take more than 5-10 minutes, and some pre-teaching preparation was encouraged. Participants were invited to start these conversations by stating that they are participating in a research project. Participants were told to complete the exercise no later than 5 days after the pretest.

After learning about the peer teaching task, participants were instructed to read a onepage document. The treatment group received a summary of PsyCap and how to develop it, whereas the control group received a text about group decision making "tips and traps to avoid". Decision making was selected as the content of the control group intervention because previous PsyCap intervention experiments also used the decision-making topic in the control condition (Luthans et al., 2010, 2008).

Since the information about the peer teaching task preceded the short informative text about one of the topics, the reading itself was meant to be of deeper quality, that is, adequate to the shift in the role of the participants because of the teaching perspective (Benware and Deci, 1984). As per our design, the teaching perspective encompasses the full process from the reading to the actual teaching, thus the intake of the new information happens already in a peer teaching context. We applied a short introductory article format with the article consisting of a single page. The information was straightforward, adopted for non-expert consumption like a magazine article so that readers could understand in simple ideas for teaching purposes what PsyCap is, what its benefits are and how one can develop it. Both the peer teaching minded reading and the brevity of the reading material are important points of differentiation from the structured reading intervention of Zhang et al. (2014).

While the treatment group received the above-mentioned material on PsyCap, the participants that were randomly assigned to the control condition received a material with similar length, complexity, and difficulty about group decision making. The group decision making reading offered *dos and don'ts* and *tips and tricks* about decision making. Participants were not aware of their intervention condition and received no incentives to participate other than the promise to receive the study results.

At the posttest, three manipulation check questions were applied. Participants had to confirm that they had completed the teaching task, they were asked to identify the topic they were assigned to and they were asked to describe their preparation and the delivery of the peer teaching. Two and a half weeks later, posttest respondents were emailed the link leading to the retest questionnaire.

Measures

Validated Hungarian versions of the original scales were used, if available (as in the case of PsyCap), in other cases we used the translation and back-translation method (Brislin, Lonner, & Thorndike, 1973). In all cases unless otherwise specified we used 6-point Likert-type scales (1 = strongly disagree and 6 = strongly agree). To support the validity of the measurements used we report in Table 2 the Cronbach alpha for each scale as well as the correlations between all variables. -

Psychological capital. PsyCap was measured with the standard PsyCap Questionnaire 12 item version (PCQ12) (Avey, Avolio, Luthans, 2011) because according to Luthans and Yussef (2017) the shorter 12 item version of the original 24 item scale is preferred in cross-cultural settings. The Hungarian version was translated and validated previously by Heitlerné Lehoczky Mária (2017) and was downloaded from Mind Garden. As per the "state-like" nature of PsyCap, participants were asked to think about themselves in that moment while reflecting on the statements of the questionnaire. In this study the internal reliability of the overall PsyCap scale was α =.82. With the exception of Resilience, which is somewhat below the standard threshold, the subscales also demonstrated acceptable reliability given that the Cronbach's alpha measure is negatively impacted by the low number of items in the individual dimensions (Cortina, 1993): self-efficacy (α =.83), hope (α =.75), resilience (α =.61), and optimism (α =.75).

Job satisfaction. Measurement of job satisfaction was carried out using the 5-item scale from Judge and colleagues (Judge, Locke Durham, Kluger, 1998) (α =.81). To match the "state-like" focus of the PsyCap questionnaire, instructions were given to rate job satisfaction as participants see their situation currently. Job satisfaction measures were taken at pretest and retest. A sample item for this scale: "I feel fairly well satisfied with my present job."

Results

Although participants were randomly assigned to the two study conditions, our first step was to establish the equivalence of the control and the treatment groups. Table 3 shows this equivalence in terms of initial levels of PsyCap and job satisfaction scores. T-test results supported our assumption that in all aspects the two groups are equivalent. Next, we looked at the mean differences in PsyCap levels between pretest (T1), posttest (T2) and retest (T3) results for the two groups. Following the analysis techniques used for the original PsyCap intervention (Luthans et al. 2007), paired t-tests and ANCOVAs were used to test whether the intervention treatment had the hypothesized effect compared to the control condition.

T-test results of the two groups (comparing both T2 and T3 to T1) are shown in Table 4. The Mean of the peer teaching PsyCap intervention treatment group significantly increased from pretest to posttest and the PsyCap scores were kept at a significantly increased level also at retest measurement compared to initial levels (T1 Mean = 56.10, T2 Mean = 58.33 and T3 Mean = 58.24, t(T1-T2) = 4.4157, p < .001, and t(T1-T3) = 2.75, p < .01). The randomly-assigned control group participating in the same peer teaching exercise – the only difference being the teaching topic - showed no statistically significant change in their posttest and retest PsyCap levels (T1 Mean = 55.83, T2 Mean = 55.91 and T3 Mean = 56.06, t(T1-T2) = .1294, p = .897, and t(T1-T3) = .351, p = .726).

As per previous PsyCap intervention research with similar design (Luthans et al, 2010 and 2008), we conducted a more in-depth analysis of the group means with the ANCOVA method. The ANCOVA should reveal to what extent the posttest and retest PsyCap scores of the intervention condition are beyond the baseline scores. A basic linear model was created with PsyCap at T1 as covariate, then the fixed factors (the experimental condition of the two groups) were used to predict posttest and retest scores. Table 5 summarizes the ANCOVA results, which show that PsyCap levels at T2 and T3 are significantly higher in the treatment experimental condition even after controlling for pretest scores (F(T1-T2) = 10.274, p < .01; F(T1-T3) = 4.523, p < .05). Based on the t-test and ANCOVA results on pretest, posttest and retest PsyCap levels we can conclude that evidence supports hypothesis 1a and 1b.

In order to go beyond significance tests and comparing mean differences between the groups (ANCOVA and t-tests), we provided also Cohen's *d* effect size results for the control and the treatment groups to evidence the impact of the peer teaching intervention. As shown

in Table 6, the effect of the PsyCap intervention in the treatment group was beyond trivial (d(T1-T2) = .28; d(T1-T3) = .25), an effect which in terms of effect magnitude between the standard PCI to the web-based PsyCap intervention (Luthans et al., 2010 and 2008). The intervention effect in the control group was trivial in magnitude both at posttest and retest (d(T1-T2) = .014; d(T1-T3) = .043). Thus, we find support for hypothesis 2.

In order to provide evidence for the intervention's effect on secondary work-related outcomes we selected to measure job satisfaction and we tried to demonstrate that job satisfaction indeed increased and that the increased PsyCap levels are related to higher job satisfaction levels. In order to test the effect of the peer teaching PsyCap intervention on job satisfaction levels we computed a t-test between job satisfaction scores at pretest and retest (T1 Mean = 23.86, T3 Mean = 24.48, t(T1-T3) = 2.753, p < .01, and we calculated the effect size of the change (d(T1-T3) = .24). We also run a hierarchical regression to detect if posttest (T2) PsyCap predicts job satisfaction at retest (T3) even if controlled for pretest (T1) PsyCap scores. Table 7 shows the t-test and effect size results as well as the regression results (F(satisfaction) = 3.993, p < .05, $\Delta R2 = .049$). The statistically significant t-test result, the modest effect size and the regression analysis showing that the increase in PsyCap is related to higher job satisfaction scores provide evidence for hypothesis 3a, 3b and 3c.

Table 8 summarizes the potential of the peer teaching PsyCap intervention compared to other PsyCap interventions in the literature. The advantages of the peer teaching intervention design used in this experiment over other intervention settings known in the literature (Lupsa et al., 2019) are cost efficiency and simplicity - given that no trained facilitators nor venue (e.g., training room), nor any special material (like training video) are necessary. Moreover, time efficiency and flexibility also characterize the presented intervention as the total time required of the participants is about 30 minutes (reading + preparation + teaching) and the timing of all three activities are up to the participant. On the other hand, a peer teaching intervention, such as in our experiment, may require more cooperation and initiative from the participants. In corporate settings it is also not trivial how to solve the procurement of the peer learners, although the multidimensional nature of the PsyCap construct (Luthans et al., 2017) opens the opportunity of organizing the full training population such that different subgroups peer teach and peer learners is decreased if the intervention doesn't involve large number of participants. The peer teaching intervention, as proposed in this article, may

also be powerfully applied in coaching settings or it may very well fit in more complex PsyCap interventions as one exercise among many others.

Discussion

Referencing role theory (Mead, 1934) and the peer teaching literature (Cate & Durning, 2007) we predicted that teaching a positive organizational behavior topic would develop the teachers' psychological resources about which they taught. A peer teaching intervention was designed and tested on a sample of working adults to explore whether a core work-related psychological resource such as PsyCap, known to be developable through interventions (Lupsa et al., 2019), would increase. PsyCap is an established construct in positive organizational behavior and positive psychology; PsyCap is malleable, and is proven to be positively related to important work-related outcomes such as work satisfaction and work performance (Luthans et al., 2017). PsyCap is also a composite or higher order construct composed of hope, self-efficacy, resilience and optimism (Luthans et al., 2004), and because of the multiple dimensions encompassed PsyCap lends itself easily to generalizing across the broader field of positive organizational behavior, which comes conveniently when developing a new intervention method.

The intervention was designed to be minimalist, that is simple, quick and low effort, involving the simple and basic information about PsyCap and a one-time teaching activity for the participants. The minimalist design was considered adequate both in order to increase willingness to participate in the experiment, and to test the limits of the peer teaching intervention idea. If such a minimalist intervention showed positive results, longer or more complex peer teaching interventions would probably also. The downside of such a simple design is, however, that the expected magnitude of the results would be modest.

Utilizing a randomized controlled trial, the treatment group demonstrated a significant increase in PsyCap levels at posttest compared to pretest, whereas the control group did not experience this development. At retest, the PsyCap level of the treatment group were still significantly higher than pretest results. ANCOVA analysis revealed that the significant PsyCap increase measured at posttest and retest was due to the intervention as T2 and T3 results were predicted by the group variable when controlled for pretest scores. This evidence attests to the effectiveness of a short peer teaching intervention to develop participants' PsyCap and that these increased levels can be maintained over time. Results

show a modest to medium effect size for the intervention – comparable to other PsyCap interventions (Luthans et al., 2017 and Lupsa et al., 2019).

In addition to measuring the participants' change in PsyCap we also took steps to test the association of PsyCap to work-related positive outcomes. By using a true longitudinal design (including three time points) we were able to demonstrate an increase in job satisfaction and the positive association between the increase in PsyCap and job satisfaction. This finding provides evidence that the peer teaching intervention beyond stimulating the participants' psychological resources has a spill-over effect on work-related secondary outcomes such as job satisfaction. Given the positive results on all three of our hypotheses we propose the peer teaching PsyCap intervention as an effective method to enhance people's PsyCap and associated work-related outcomes

The peer teaching PsyCap intervention experiment was motivated by the psychological benefits of peer teaching (Cate & Durning, 2007; Whitman, 1988) and the idea of "role taking" to shape human behavior (Mead, 1934). This study confirms that taking upon oneself the teacher role does have powerful effects on the teachers' self-development as it relates to a broad array of psychological resources represented by PsyCap. Our research confirms, that role theory - once instrumental to the formulation of social psychology (see Katz & Kahn, 1966) - is still very relevant today: it can and it should be applied within the context of positive organizational behavior. The change in perspective, the taking up of the teacher's role, is an effective way to involve participants more deeply, both personally and socially, while at the same time also endowing them with expert-like qualities, all which help participants to access more easily the very same positive psychological resources that the teaching is about. By choosing to experiment with the multidimensional higher order PsyCap construct that includes hope, self-efficacy, resilience and optimism (Luthans et al., 2004), we hope to have selected a psychological resource that allows for the generalization of our results across positive organizational behavior. Thus, the peer teaching intervention, we propose, could be applied with positive psychological resources other than PsyCap.

Peer teaching in general (Cate & Durning, 2007) has demonstrable positive effects for the person carrying out teaching activity in terms of deeper learning as well as psychologically (e.g., increased self-esteem). Our experiment, however, shows that psychological benefits of peer teaching can be boosted by centering the peer teaching activity on a positive psychological resource like PsyCap. Thus, the deeper learning when preparing to teach the material, the involvement with the teaching activity and the shift in perspective when taking up of the expert role, all reinforce the process of personal integration of the chosen psychological resource. Our experiment captures the difference in effect between the "standard" peer teaching of a practical topic not centered on a psychological resource and the peer teaching of a psychological resource. In terms of PsyCap, which is a rather broad psychological construct composed of four dimensions, the peer teaching of "group decision making *dos and don'ts*", results in some increase which however is not statistically significant. The same peer teaching exercise, if centered on the topic of PsyCap, does develop participants PsyCap significantly and increased levels are maintained over time. Peer teaching centered on positive psychological resources.

In terms of the proposed peer teaching PsyCap intervention, we are content to demonstrate the effectiveness of the method, and we do not suggest our intervention design being followed in a strict sense. The minimalist design was instrumental to test the method at is breaking point. Advantages and disadvantages of our intervention format are summarized in Table 8. peer teaching interventions with richer designs may be expected to produce larger effect sizes. The peer teaching activity could equally be used as an additional element in more complex interventions as Luthans and colleagues (2017) seems to suggest that PsyCap intervention applying a "shotgun" approach are more effective in general. A peer teaching intervention, of course, comes with its distinct resource requirements. For instance, peer teachers evidently require peer learners, moreover, these learners better be genuine in order to maximize the effect (Durling and Schick, 1976). Overall, we conclude based on our minimalist experiment, that the peer teaching of PsyCap has the potential to develop the peer teachers' PsyCap resource, which then maintains significantly elevated levels at least three weeks after the intervention and that this increase in PsyCap is positively related to work-related measures such as satisfaction at work. We speculate that longer or more complex intervention designs are likely to result in increased effect sizes compared to our minimalist experiment and, moreover, that other positive organizational behavior resources are also likely developable through peer teaching in the same way as PsyCap.

Limitations

In this study we demonstrated that peer teaching is a successful intervention method in the case of Psychological Capital, a core psychological resource, however, results of our experiment should be considered along with the following limitations. First, the sample used was a convenience sample that is non-representative. Although typical of most experiments in the social sciences, these types of non-representative samples can result in in accurate generalizations. The use of several recruitment methods (including both internet-based and paper fliers) it is somewhat less likely that are sample would be skewed to a particular demographic although this is always a risk of non-representative samples.

Second, due to the online nature of this study, researchers were not in full control of the process or experience of each individual participant. Rather participants were counted on to carry out instructions in their own time and environment, and even these instructions gave much freedom to decide for example about the person of the peer learner and how much time to prepare for the peer teaching. In order to diminish such disadvantages manipulation checks were used to exclude participants who failed to follow the instructions.

Third, although our results are based on self-report data, this is appropriate for measurement of PsyCap, job satisfaction, and the demographic variables used in our analyses. Given the fact that the primary contribution of our study relates to PsyCap directly, the same-source nature of our data is not considered to be problematic.

Four, the peer teaching experiment did not control for the stand-alone effect of the short reading material. It is a reasonable concern that some of the PsyCap increase came from the reading as opposed to the peer teaching exercise. The individual effects of the short reading and the teaching were not measured separately because of the following considerations. Firstly, there can be no peer teaching without first receiving some information about the teaching topic first, thus, establishing the individual effect of the reading and the teaching, from the perspective a peer teaching intervention is irrelevant. Nevertheless, we minimized the stand-alone effect of the reading to preserve the prevalence of the peer teaching activity in the experiment. Second, the expected number of participants also limited our possibility to create a control group with the "reading only" condition. Our focus was rather to show on a sufficiently large sample that the teaching of positive organizational behavior increases the psychological resources in question as opposed to the teaching of other topics. Finally, by not controlling our intervention results for the information input about PsyCap we simply

follow the tradition of previous PsyCap interventions in the literature (Lupsa et al., 2019). Part of PsyCap intervention is to explain the theory of PsyCap (Luthans et al., 2017), likewise, we suggest that peer teaching intervention in positive organizational behavior cannot be some disjoint teaching from theory, rather it should be about exploiting the affective energy inherent in teaching in order to integrate the theory.

It is worth mentioning also that this peer teaching PsyCap intervention experiment was not controlled against other types of PsyCap interventions. This means that we are unable to fully compare the results of prior interventions with those that are reported here.

Finally, we use our PsyCap experiment to draw conclusion for positive organizational behavior in general about the effectiveness of peer teaching interventions. While we deliberately picked a wide-ranging multidimensional construct (PsyCap) and used a minimalist intervention design to make this generalization possible, we are aware that our conclusions about the peer teaching intervention being suitable to develop also other positive organizational behavior resources, are just what we said they were – justified generalizations.

Conclusion

Results of this study support the case that peer teaching is an effective method to develop PsyCap. We recommend that practitioners and businesses wishing to develop their employees' positive resources consider the peer teaching PsyCap intervention either as a stand-alone intervention or as a component in more complex PsyCap interventions for maximum effect. Beyond the focus on PsyCap, this experiment supports the case that peer teaching can be an effective method in positive organizational behavior to develop positive psychological resources. By applying role theory through peer teaching many other work-related positive qualities could be effectively developed.

Tables (Peer Teaching)

TABLE 1

Study	Sample	Control	Design	Delivery	Assessment	Measures	Outcomes
Bauman (2014)*	Stud.	Waiting list	Experiment	Trainer	PCQ	Pre, post-test fol-low-up	PsyCap
Dello Russo et al. (2015)	Stud.	Waiting list	Quasi-exp.	Trainer	PCQ	Pre, post-test fol-low-up	PsyCap
Eaton (2015)*	Empl.	Waiting list	Quasi-exp.	Video materi-al	PCQ	Pre, post-test	PsyCap
Hodges (2010)*	Empl.	Passive	Experiment	Trainer	PCQ	Pre, post-test	PsyCap
Luthans et al., 2008	Empl.	Active	Experiment	Online material	PCQ	Pre, post-test	PsyCap
Luthans et al., 2014	Stud.	Active	Experiment	Trainer	PCQ Academic	Pre, post-test	PsyCap
Meyers et al. (2017)	Empl.	Waiting list	Quasi-exp.	Trainer	Compound PsyCap	Pre, post-test fol-low-up	PsyCap
Rinkoff (2017)*	Empl.	Active	Quasi-exp.	Trainer and video	PCQ	Pre, post-test	PsyCap
Van Wingerden et al. (2016)	Empl.	Passive	Quasi-exp.	Trainer	Compound PsyCap	Pre, post-test	PsyCap
Zhang et al. (2014)	Empl.	Passive	Experiment	Reading material	PCQ	Pre, post-test fol-low-up	PsyCap

* Doctoral dissertations

Correlations and Cronbach's Alpha (Control+Treatment Groups)										
Measures 1 2 3 4 5 6										
1 PsyCap	.82*									
2 Self-Efficacy	.71	.83*								
3 Hope	.82	.47	.75*							
4 Resilience	.66	.28	.31	.61*						
5 Optimism	.65	.23	.51	.27	.75*					
6 Job Satisfaction	.48	.31	.49	.25	.31	.82*				

TABLE 2

* Alpha value to measure the internal consistency of each scales

TABLE 3									
Equivalence of Treatment and Control Groups according to various measures									
Measures	Mean T	Mean C	t-Value	p-Value					
PsyCap at T1	56.10	55.83	-0.204	0.838					
Job Satisfaction at T1	24.10	23.86	-0.3378	0.736					

	Paired t-Tes	t: Control :	TA and Treat	BLE 4 tment Gr	oup, T1 v.	. T2 and 7	Г 1 v Т3	
					T1	-T2	T1-T3	
		Mean	Mean	Mean				
	Measure	<i>T1</i>	<i>T2</i>	<i>T3</i>	t-Value	p-Value	t-Value	p-Value
	PsyCap Treatment group	56.10	58.33	58.24	4.4157	.000	2.75	.0078
	PsyCap Control group	55.83	55.91	56.06	.1294	.897	.351	.726
Noter *	$***n < 0.01 \cdot **n < 0.1 \cdot *n < 0.5$							

Note: *** p < .001; ** p < .01; * p < .05

ANCOVA Controlling for PsyCap at T1								
	T1 and T2			T1 and T3				
Variables	F-Value	p-Value	F-Value	p-Value				
PsyCap at Time 1	206.7	.000***	107.5	.000***				
Randomly assigned group	10.274	.0017	4.523	.0354*				

TABLE 5

Note: *** p < .001; ** p < .01; * p < .05

Effect Sizes and Confidence Intervals (95%)										
	Cohen's d									
	T1 and			T1 and						
	T2			Т3						
Intervention effect on	lower	effect	upper	lower	effect	upper				
PsyCap Treatment group	073	.28	.63	1	.25	.6				
Control group	33	.014	.36	3	.043	.39				

TABLE 6	
Effect Sizes and Confidence Intervals (95%)	
Cohen's d	

TABLE 7

Regression Analysis of PsyCap Effect on Work Related Outcomes										
T1 and T3								ŀ	lierarchica	al Regression Analyses of
Paired t-test			Co	ohen's d (95%	i ci)	PsyCap at T2_Controlled for T1 PsyCap				
Intervention effect on		Mean T1	Mean T3	t-Value	lower	effect	upper	df	ΔF	ΔR2
Job	Satisfaction									
(Treatm	ent group)	23.86	24.48	2.753**	-0.11	0.24	0.59	60	3,993*	0,049

Note: *** p < .001; ** p < .01; * p < .05

TABLE 8

Comparative advantages of the Peer Teaching Psychological Capital Interventions

Advantages	Explanation
Cost efficiency and simplicity in organization	No trained facilitators nor venue (e.g., training room), nor any special material (like training video) are necessary.
Time efficiency and flexibility	The total time required of the participants is about 30 minutes (reading + preparation + teaching) and the timing of all three activities are up to the participant.
Disadvantages	_
Cooperation and initiative required of the participants	The peer teaching interventionas proposed, requires participants to socially engage and take intionative towards a peer learner. Appointed pairs by the organizers could ease this requirement.
The procurement of the peer learners	It is also not trivial how to solve the procurement of the peer learners. The multidimensional nature of the PsyCap construct makes it possible to organize the full training population such that different subgroup peer teach and the peer learn different dimensions of the PsyCap construct.

The Positive Psychological Basis, Measurement and Outcomes of Covey's 7Habits

ESD Conference paper, Published: April 2020.

Szerdahelyi, M. & Komlósi, L. (2020): The Positive Psychological Basis, Measurement and Outcomes of Covey's 7Habits

Abstract

The effectiveness of corporate personal development trainings (CPDT) is to be explained by means of work-related positive psychological constructs. Moreover, training specific measurements of attitudes and behaviors are to predict personal levels in these underlying or related psychological resources. In this article we take Covey's 7Habits training program as example and explain its effect in terms of the basic need satisfaction motivation model of Self-Determination Theory (SDT) composed of Autonomy, Competence and Relatedness. We set out to develop a psychometrically valid 7Habits measurement tool, which is further analyzed with mediation models and shows the theorized relationship to the Self-Determination Theory framework. We conducted a study to test the positive associations between the proposed 7Habits construct and established positive psychology resources such as SDT, PsyCap and Thriving at Work. Results of multiple regressions show that the 7Habits construct is a significant predictor of both PsyCap and Thriving at Work even after controlling for basic need satisfaction. This paper contributes to the efforts to bridge the gap between academia and corporate best practices. Initial evidence is provided that the 7Habits training material is in line with the Self-Determination Theory of personal growth, and that the 7Habits is a measurable and coherent construct that predicts important work-related psychological resources.

Keywords: Construct Validation, Corporate Personal Development Programs, Covey's 7Habits, Psychological Capital, Self-Determination Theory, Thriving at Work

Introduction

Positive psychology, first conceptualized and formulated by Abraham Maslow (1954), then institutionalized by Martin Seligman and Mihály Csikszentmihályi (2000) is the science of human psychological wellbeing, leading to "potentialities, virtues, achievable aspirations, or full psychological height" (Maslow, 1954, p. 354). Since then, there has been growing evidence that psychological wellbeing and flourishing have positive work-related outcomes such as increased performance and organizational loyalty (Luthans, Carolyn and Youssef, 2017). The discipline focusing on the intersection of organizational behavior and positive psychology was named positive organizational behavior (POB) by Luthans (2002a, 2002b). Thus, theories that link psychological resources (attitudes, behaviors) to positive work-related outcomes belong here. Among the several constructs available in the work-related positive psychology literature for the purposes of this study we invoke Self-Determination Theory (Deci and Ryan, 2000) as a fundamental theory linking psychological need satisfaction and performance through motivation. We will also refer to Psychological Capital (Luthans, 2004) as a multidimensional higher order psychological resource at work, and the Thriving at Work construct (Porath et al. 2012) measuring learning and vitality at work.

At the same time, while such scientific theories were developed, the practitioners came up with applications loosely linked to theory. These practices became widely popular in the form of employee training programs or self-help books. Covey's 7Habits framework (1989) of personal effectiveness is one among the most popular corporate trainings worldwide. In terms of content and purported outcomes the 7Habits belongs to POB insofar as it is a collection of ideas and practices about personal flourishing leading to increased levels of effectiveness that benefit to whole organization. Since the ideas and practices proposed by Covey have considerable face validity and are similar in many ways to the mentioned positive psychology constructs, we were curious how they relate to each other. Driven by this objective, (i) we made steps to link Coveys 7Habits framework to extant positive psychological theories (most notably, SDT), and (ii) we created a pool of items for the measurement of the 7Habits which were used in a subsequent study to develop a psychometrically valid measurement tool. Finally, (iii) we run a series of statistical analysis (regression, mediation and ANOVA) to show that the proposed 7Habits construct positively relates to the extant work-related constructs while, at the same time, it is also distinct from them.

Literature and Hypotheses development

The 7Habits Construct

Covey's 7Habits framework (1989) of personal effectiveness is primarily a book which presents the seven habits that one should master for long term personal and social effectiveness. However, from an organizational point of view, it is more significantly an employee training program applied internationally in corporate settings with great success.

Covey's theory of the 7Habits is a story that starts with the dependent self (ineffective, controlled from outside and unhappy) discovering the power and the freedom to become independent (effective, internally controlled) and subsequently moving even further to a state of higher-level effective interdependence (a state characterized by win-win deals and synergy with other people). According to Covey, the 7Habits entail a paradigm shift (attitudinal change) for each habit which leads to long term effectiveness in all areas of life.

We recapitulate in a condensed form Covey's 7Habits framework (Covey 1989). Habit 1 is "Be proactive". Individual attitudes towards life have an enormous effect on one's success and happiness. This simple realization is often sufficient to shift one's focus from grievances and helplessness to ownership. Habit 1 is about realizing that each of us is the programmer of their lives and thus we do not have to keep running the program that others wrote for us, but we can write our own. Habit 2 is "Begin with the end in mind". This is about planning short term and long term. Once we have realized that we are the programmers of our lives, we need to write the program that we want to live. Heavy emphasis is put by Covey on meaningful goals to plan for as opposed to simply useful or self-serving goals such as money or success. Human relationships and learning are proposed to be at the center of our planning. Habit 3 is "Put first things first". Once we have written the program, it is time to execute it by living each day based on those priorities we planned out for ourselves. These three first habits are collected under the category or dimension of Independence. Independence however is not the maximum of long-term effectiveness.

Habit 4 is "Think win-win". This habit puts focus on human relationships and warns against both wanting to win at the expense of others (Win-Lose), and letting others win at

the expense of us not winning (Lose-Win). Habit 5 is "Seek first to understand then to be understood". This habit is both about understanding others and influencing others. Covey recognizes that we can best influence people who first have sensed that they have influenced us. Habit 6 is "Synergy with others". This habit is about building on the strengths of others. Habit 7 is "Sharpen the saw". This habit is about regeneration and responsible resource management. Habits 4 to 7 are the habits of Interdependence which is the state – according to Covey – in which humans thrive (Covey, 1989). The organic anthropology of the 7Habits, that is the view that people are made for being independent and thrive in social Interdependence with others, and that everybody naturally has all the resources required, is very similar to some of the positive psychology theories.

While it is difficult to imagine a fully comprehensive and testable theory for the kind of practical content captured in the 7Habits, it may be possible to link the framework in general elements of it to existing tested theories. To date, no such attempt has been published, in fact, no definitive endorsement or rejection was found in the extant literature related to the content and outcome of the 7Habits. That peer reviewed articles that treat the 7Habits are not evaluative in this sense. Jackson (1999), for example, gives a rhetorical critique the 7Habits and the movement it established. Jackson's main concern is that the 7Habits comes with certain ideological roots and that the system built by Covey is quasi-religious. This arguably is more a critique of the 7Habits movement than the book or the training material. As for the content of the 7Habits, Jackson admits that the white magic of Covey consists in presenting obvious and known facts as revelations. In a backhanded way, this could be interpreted as an endorsement of the 7Habits framework because it acknowledges its validity. Mccabe (2011) counters the fear of Jackson (1999) and others that have been vocal critiques of management gurus like Covey. The point of Mccabe's is that guru ideas transform poorly into training and understanding among the trainees. This observation, while it may represent a practical problem for training settings, is of no consequence for the content validity or measurability of the 7Habits that is at the focus of this article. Some other publications (Starck, 1995; Millar, 2013) describe organization-wide 7Habits programs, but no measurement tool or construct development is attempted.

The lack of attempts to link the 7Habits to existing psychological theories, given the training programs popularity, may be a gap and a missed opportunity in the literature. Approving or disproving of the content of expensive programs involving so many people in

so many organizations based on psychological theories would be useful information for both organizations and practitioners. Given the complexity of the 7Habits the opportunity to ground it in psychological theory presents itself on the level of details (each habit separately) and on the level of the composite 7Habits. In this article we try to look holistically at Covey's framework and try to ground it in one suitably complex psychological theory of personal growth, namely Self-Determination Theory.

Hypothesis 1: Self-Determination Theory provides psychological explanation to why the 7Habits framework as described by Covey could be conducive to personal growth.

The psychological basis of the 7Habits – perspective from Self-Determination Theory

The 7Habits could be conceived of as a multidimensional construct that encompasses both personal and relational effectiveness. Because of the strongly articulated private and public facets of the 7Habits, only theories that observe people in their complex individual and social reality could be considered. Psychological Capital (Luthans, 2007), for example, although itself a multidimensional construct and with similarities in many aspects, is lacking the social dimension that is required to account for the complexity in the 7Habits. In fact, most psychological constructs have a narrow focus on specific psychological qualities in order to increase precision. Any grand theory behind the 7Habits should be such that it explains the seven habits in unity and does not contradict or exclude any of them and should have a similarly positive and organic anthropology. Self-Determination Theory (SDT) is theorized to be a good fit to ground the 7Habits in psychological theory. According to SDT, as elaborated by Edward L. Deci and Richard M. Ryan (2000), motivation arises continuously in order to satisfy the three basic psychological needs: autonomy, competence and relatedness. These are necessary conditions for psychological growth, integrity, and well-being. When these needs are being satisfied higher level quality of human behavior occurs, which is conducive to better learning and work performance. In SDT Autonomy is the principal factor that accounts for most of the consequences and autonomy is the need that if it is satisfied it can to some extent substitute the satisfaction of the two other basic needs. The satisfaction of the competence and relatedness basic psychological needs is necessary for self-determination to be a lasting experience of the individual. The three basic needs together explain better the behavior and motivation of people than any of them alone or in pairs. (Deci and Ryan, 2000).

SDT distinguishes between different levels of motivation that are best understood as regulatory processes that are of consequence to the quality of the behavior and the resulting degrees of need satisfaction. Intrinsic and integrated regulation are conducive to the highest quality of behavior and need satisfaction, when a deliberately chosen activity is done out of sheer interest

(for example: flow (Csikszentmihályi, 1990)) or is understood to be very important, proper, good or necessary and is willingly carried out. This is called internal motivation. The more externally regulated a behavior is the less need satisfaction comes of it.

There are several possible links between the Habits and the basic psychological needs. It is theorized that the first three habits leading to Independence are linked to Autonomy and Competence among the basic needs while the habits of Interdependence are principally linked to Relatedness but also to Autonomy and Competence.

It is further theorized that acting out the 7Habits results in need satisfaction and leads to higher quality behavior. If personal responsibility for one's decisions and actions is accepted as per Habit 1, more so if acted out, then Autonomy needs are being satisfied. Habit 2 is about planning, that is making decisions for the future, and about slicing up one's complex situation into roles, mission statements, hierarchies of values, short and long-term plans. This further increases the sense of Autonomy. Habit 1 and 2 can be strong catalysts of the intrinsic and integrated regulation leading to higher quality behavior in SDT. Habit 3 is about executing Habit 2 starting with what's most important not what's most urgent. With the sense of accomplishment resulting from this, Habit 3 ties the first three habits to Competence need satisfaction as well. Habits 4 to 6 tie into Relatedness. Although Relatedness need satisfaction can come from many things beyond what's implied in Habit 4 to 6, it seems evident that these habits of thinking win-win and seeking to understand others and building on the strengths of others are naturally leading to Relatedness need satisfaction.

Given the sufficiently complete and overall strong association between the 7Habits and SDT, we can conclude that Covey chose a framework to organize his ideas that seems justified psychologically and as its outcomes increase personal well-being, effectiveness and other psychological resources can be expected.

We thus, find theoretical support for Hypothesis 1. Further evidence-based support will be provided in the Results section (4.2.) about the relationship between the 7Habits components (Independence and Interdependence) and the Self-Determination Theory basic need satisfactions (Autonomy, Competence and Relatedness).

Also, based on the face validity of the 7Habits as a complex yet unitary framework and its overall match to Self-Determination Theory, we hypothesize that it is possible to create a psychometrically valid 7Habits measurement tool that draws on all seven of the habits and mirrors the unitary framework suggested by Covey.

Hypothesis 2: A valid measurement tool can be developed from questionnaire items representing the 7Habits framework.

7Habits and increased psychological resources as outcomes

The 7Habits, just like any other CPDT, is typically used by organizations to improve employee motivation, behaviors or attitudes. In the previous section detailed account was given why the application of the 7Habits could indeed lead to increased levels of basic need satisfaction, thus to more intrinsic and integrated motivation. Through similar mechanisms, we expect that the application of the 7Habits could lead to increases in Psychological Capital and Thriving at Work. PsyCap composed of four dimensions, namely: Hope, Efficacy, Resilience and Optimism, at face value is strongly related to the habits of Independence: 1. Be proactive, 2. Begin with the end in mind and 3. Put first things first (see the elaboration in section 2.2.) Likewise Thriving at Work composed of Vitality and Learning at face value is related to Independence as in Covey's framework. The habits of Interdependence although maybe in an indirect or mediated fashion - are also expected to relate to both PsyCap and Thriving. These psychological resources, PsyCap and Thriving as well as SDT are established predictors of important work-related variables such as performance and satisfaction with work. The positive effect of the 7Habits on work-related variables would be possible to explain through the expected relationship between the 7Habits and SDT, PsyCap and Thriving, which in turn then explain the work performance and satisfaction. The direct link between the 7Habits and these work-related variables was not possible to test in our study, so we rely on this indirect link to underline the work-related outcomes of the 7Habits. Therefore, we formally hypothesize that the 7Habits will be a significant predictor of PsyCap, Thriving and SDT.

Hypothesis 3: The 7Habits will positively relate to basic need satisfaction at work (SDT, PsyCap and Thriving at Work.

For the 7Habits construct to be useful on top of simply being meaningful we have to test its distinctness from SDT, which is the construct with which it shows the most similarity. It would not be of much use if we had simply reproduced the Self-determination framework albeit under a new name starting from Covey's framework. We theorize that our 7Habits construct will be significantly predicting PsyCap and Thriving (outcome variables) even after controlling for SDT.

Hypothesis 4: The 7Habits will positively relate to PsyCap and Thriving at Work even when controlled for the effect of SDT basic need satisfaction.

Method

Beyond the theoretical framework developed in previous chapters, where we set out to explain the 7Habits training material on the basis of positive psychology, or more specifically in terms of the Self-Determination Theory, and study was conducted in order to develop and validate the 7Habits as a psychometrically valid construct. This study was done in a Budapest based local office of a large Dutch-American tech company. The sample size (n=58) reflects the total population of the office. Beyond several established scales like Thriving at Work, SDT Basic Needs at work, and PsyCap, a newly developed 7Habits scale was also inserted in the self-report questionnaire. The surveys were conducted in English with the original language of the questionnaires. This was not deemed to be a blocker because English is the work language for all employees, since this office is a local pocket of a large international community. Statistical analysis such as regression models were executed with R basic package (R Core Team, 2017). Mediation models were created with the Psych package for R (Revelle, 2019). Confirmatory Factor Analysis was done with R statistics software Lavaan package (Rosseel, 2012). The study beyond serving scientific
purposes was also used as an employee survey for the company measuring employee wellbeing.

3.1. Sample

The Budapest office of the tech company comprises in total 58 people (31 male and 27 female employees). A total of 53 people were knowledge-workers in the fields of IT and business. HR, finance and assistance make up 5 people. Given the relatively small sample size, no distinction was made between areas of responsibility within the employee survey. Although the surveys were not obligatory, management recommended highly to participate, therefore 52 people (~90%) filled in the employee survey. The final sample size for the analysis was 52.

3.2. Measures

All questionnaires were used in the surveys with a 6 point Likert-like scale in order to minimize the bias deriving from the answer format. Scales went from 1 "Strongly disagree" to 6 "Strongly agree". The order of the questions was randomized in order to eliminate order bias from the responses.

Thriving at Work. It was thought that any construct validation for the Covey's 7Habits could be more robust by comparing results to constructs developed for similar situations. Thriving at Work was measured with the scale developed by Porath et al. (2012).

Self-Determination. Autonomy, Competence and Relatedness, the facets of Self-Determination were measured with the Basic Psychological Need Satisfaction at Work Scale (Ilardi, Leone, Kasser, & Ryan, 1993; Kasser, Davey, & Ryan, 1992). SDT is theorized to be the psychological context in which Covey's 7Habits can be worked out as a coherent construct despite its complexity.

Psychological Capital. PsyCap was considered as a potential framework in which to ground the 7Habits, however, the cooperative dimension of Habits 4-7 seems not included, but rather complementary to the personal focus of PsyCap, while the first 3 Habits of personal effectiveness are also argued to be distinct from PsyCap. To measure PsyCap the 24 item PCQ was used developed by Luthans, Avolio et al. (2007) and Luthans, Youssef and Avolio (2007).

The seven habits. Covey's framework was measured with the 7Habits 12 item scale that was developed by the authors of this paper, after not having found a psychometrically valid extant scale in the literature for the seven habits. See details of the scale development and construct validation in later sections.

Results

The topic advanced in this paper required the development of a theoretical framework within positive psychology for the 7Habits training material, which subsequently was tested in a study with quantitative methods. The section below focuses on the results of the study conducted: results for Hypotheses 2, 3 and 4 are developed. Theoretical results for Hypothesis 1 related to the match between Self-Determination Theory and the 7Habits framework was provided in the first part of the paper, in this section additional evidence of the match theorized is presented in Table 3 and the mediation models in Figure 1, 2 and 3.

Construct Development of the 12 item 7Habits scale

We theorized that it is possible to develop a psychometrically valid 7Habits construct and a related measurement tool because of Covey's conceptualization of the 7Habits as a holistic system and because we could undergird this claim by demonstrating how the 7Habits matches existing psychological theories. Initial consideration was given to the Personal Effectiveness Questionnaire (PEQ65) which is the standard questionnaire with which the Covey related training organizations measure participants effectiveness. However, due to the length of the questionnaire and to the fact that several questions could be theorized at face value to relate strongly to more Habits the idea to use PEQ was dropped. A new 7Habits scale was therefore developed by the authors based on Covey's book. A 28 item pool of items was created with the exigence to include all major ideas for each habit while eliminating redundancies. For the employee survey all items were included. This data set was then used for psychometric validation of the 7Habits construct and measurement tool. A series of factor analyses was carried out for several factor combinations initially including all items then gradually dropping the once with low loadings and relatively lower face validity. (Stanton et al, 2002). Finally, a 12 item measurement tool was created representing all 7 habits. The confirmatory factor analysis (CFA) results for these 12 items in the one 7Habits factor model are CFI=.991, RMSEA=.014 and SRMR=.086. Two of the three fit indices show good fit, while SRMR is slightly above the cut off, demonstrating overall acceptable fit for this model as per Bentler and Hu (1999). By further reducing the number of items the fit index SRMR could have been improved to also meet the cut off criteria at the expense of significant face validity reduction. The 12 items demonstrating sufficient model fit were concluded to be necessary to claim acceptable face validity, that is to cover sufficiently the 7Habits theory. The Cronbach's Alpha for these 12 items is above the conventional cut off (.72), thus we conclude that the 12 item 7Habits scale meets the psychometric criteria to be used for the purposes of this study. Psychometric properties of the 7Habits scale are shown in Table 1.

Source	X2	df	р	CFI	RMSEA	SRMR	Alpha
One factor							
7Habits model	54.566	54	.453	.991	.014	.086	.72

Table 1: CFA of the 7Habits(12) Construct (Source: The authors' creation)

As for the face validity of the scales, the 12 items capture important segments of Covey's framework and they touch on all seven of the seven habits. While more comprehensive tools could be developed in the future, our effort already confirm that the seven habits can be organized in a meaningful psychological construct. Thus, the aim of creating a short yet psychometrically valid and coherent tool to measure the seven habits, was met, providing evidence for Hypothesis 2. Items of the 7Habits(12) scale are listed in Table 2. Items marked with an "(R)" at the end of the text are reversed items.

Item No.	Item text / Habit
	1. Be proactive
1	I focus on things that have an impact
2	I feel responsible for what I do and don't do
	2. Begin with the end in mind
3	Before starting something new, I think about how it helps me achieve my goals
4	I feel motivated by my goals
	3. Put first things first
5	I start with the difficult tasks that have the most added value
6	I am often overwhelmed by urgent tasks and requests (R)
	4. Think win-win
7	I am open and clear about what I need and what I can do for others
8	I believe that life is full of opportunities for everybody
	5. Seek first to understand then to be understood
	While listening to somebody I am already thinking about what my response will
9	be (R)
10	I make sure that the other person feels understood by me
	6. Synergy with others
11	I build on the strengths of others to get something done
	7. Sharpen the saw
12	I engage in lasting relationships and friendships

Table 2: Items of the 7Habits scale (Source: The authors' creation)

Construct Validation with mediation models

Both SDT and the 7Habits are complex yet coherent theories. As self-determination has three distinct basic psychological needs (autonomy, competence and relatedness) also the 7Habits framework has two main dimensions: Independence and Interdependence. In order to complement the theoretical work by which we grounded the 7Habits in Self-Determination Theory with empirical study results we assumed and tested the following relationships between the main dimensions of the two main constructs. Independence from the 7Habits framework would relate strongly to autonomy and competence while the effect of Interdependence on autonomy and competence is mostly mediated by Independence. Interdependence on the other hand would relate strongly to relatedness while the effect of Independence on relatedness will be almost completely mediated by Interdependence. Because of the overall strong relationship between the 7Habits and SDT components shown in Table 4, our focus in this section was on demonstrating how Independence and Interdependence mediate each other's effects in relation to SDT individual and social dimensions. Table 3 shows the multiple regression results while Figure 1, 2 and 3 demonstrate the mediations analyzed with standard bootstrapping method in R Psych package (Revelle, 2019).

Dependent variables	Step 1			Step 2		
	beta	р	R2	beta	р	$\Delta R2$
Autonomy (SDT)						
Step1: Interdependence (Habit 4,						
5, 6 and 7)	.69	.000	.234	.4	.069	
Step2: Independence (Habit 1, 2						
and 3)				.444	.03	.07
Competence (SDT)						
Step1: Interdependence (Habit 4,						
5, 6 and 7)	.6	.000	.269	.32	.059	
Step2: Independence (Habit 1, 2						
and 3)				.42	.008	1.001
Relatedness (SDT)						
Step1: Independence (Habit 1, 2						
and 3)	.619	.02	.104	.081	.789	
Step2: Interdependence (Habit 4,						
5, 6 and 7)				.959	.005	1,4

Table 3: Multiple Regression Analysis of SDT and 7Habits primary dimensions(Source: The authors' creation)



Figure 1: Independence strongly mediates the relationship between Interdependence and Autonomy (Source: The authors' creation with Psych R package)



Figure 2: Independence strongly mediates the relationship between Interdependence and Competence (Source: The authors' creation with Psych R package)



Figure 1: Interdependence strongly mediates the relationship between Independence and Relatedness (Source: The authors' creation with Psych R package)

7Habits outcomes

In two steps - with regression analysis and ANOVA - we set out to demonstrate the close relationship between the 7Habits construct and other well established positive psychological constructs such as SDT, Thriving at Work and PsyCap, but also the distinctness of the new

7Habits construct from these. When developing new constructs that are theorized to belong to a family of similar constructs, it is important to demonstrate the close relationship between them. In our case, as we are discussing the 7Habits construct created for a corporate personal development training, we theorize established positive psychology constructs as outcomes of the individual 7Habits levels. Table 4 shows the regression results all of which are significant and reveal positive association between the 7Habits construct and the dependent outcome variables.

Dependent variables	beta	se	t	F	df	р	R2
Basic Need Satisfaction							
(SDT)	1.299	.211	6.15	37.82	1, 49	.000	.435
Autonomy (SDT)	.423	.091	4.65	21.62	1, 49	.000	.306
Competence (SDT)	.376	.07	5.335	28.47	1, 49	.000	.367
Relatedness (SDT)	.499	.141	3.525	12.42	1, 49	.000	.202
Thriving at Work	1.059	.173	6.121	37.47	1, 49	.000	.433
Psycological Capital	1.499	.222	6.734	45.35	1, 49	.000	.48

Table 4: Regression Analysis of the 7Habits and theorized outcomes(Source: The authors' creation)

	F-	р-
Variables	Value	Value
PsyCap		
Control for SDT basic needs	17.41	.000
7Habits	9.386	.003
Thriving at Work		
Control for SDT basic needs	16.69	.000
7Habits	5.54	.022

Table 5: ANOVA of the work-related psychological outcomes of 7Habits, controlled for SDT basic needs (Source: The authors' creation)

As the 7Habits construct was shown to be a psychologically sound framework through matching it to Self-Determination Theory, it is necessary to demonstrate the 7Habits distinctness from SDT in order not to reinvent the wheel. Table 5 shows that the effect of the 7Habits is significant on top of the basic need satisfaction effect on the other two outcome measures: PsyCap and Thriving. In both cases when comparing with ANOVAs the models where only self-determination predicts the outcomes and the model with 7Habits added, the latter model emerges a significantly superior, thus we find evidence for Hypothesis 3 and Hypothesis 4.

Discussion

In this paper we started off with the assumption that corporate personal development trainings (CPDTs) have underlying psychological working mechanisms that explain why the CPDTs positively affect employee attitudes. It was further assumed that CPDT working mechanisms are associated with positive psychology, because this is the branch of psychology that aims at building on positive qualities (in contrast with other traditional branches of psychology that try to improve negative psychological qualities) (Seligman and Csikszentmihályi, 2000). We looked at Stephen Covey's The Seven Habits of Highly Effective People as a widely known and recognized CPDT (Covey, 1989) and tried to explain why the training application of Covey's framework would be conducive to personal growth. Due to the complexity and holistic approach of the 7Habits which encompasses personal growth in general, we tried to match it with a similarly holistic psychological theory. We theorized that the Self-Determination Theory (SDT) of motivation would give a good explanation of the reported benefits of the 7Habits trainings. Thus, our Hypothesis 1 was that Self-Determination Theory provides psychological explanation to why the 7Habits framework as described by Covey could be conducive to personal growth. Theoretical support for this hypothesis was provided in section 2.2 where we successfully identified a similar personal growth mentality at the center of SDT and the 7Habits that recognizes growth and flourishing as the natural state of the human person that is reached through the satisfaction of the basic psychological needs of Autonomy, Competence and Relatedness (SDT), or through the personal Independence and social Interdependence (7Habits). On a more detailed level of the two theories, in section 2.2 we explained why practicing the 7Habits may lead to basic need satisfaction, thus to personal growth.

Further evidence was provided of the match between SDT and the 7Habits when we used multiple regression and mediation models to analyze the relationship between the dimension of SDT (Autonomy, Competence and Relatedness) and the dimensions of 7Habits (Independence and Interdependence) which we measured in a study described in the Method section. This was necessary in order to confirm if the internal structure or the dimensionality of SDT and the7Habits is as per expectations according to the individual and social components. The expected relationship between the components or dimensions of SDT and the 7Habits was that the first three habits in the Independence dimension are foremost related to Autonomy and Competence in the SDT framework, but also that Independence. Regression and mediation models in section 4.2. confirm these relationships. Similarly, it was expected that the second four habits in the Interdependence dimension are foremost linked to Relatedness in the SDT framework, but also that Interdependence. Regression and mediation models in section 4.2. confirm these relationships. Similarly, it was expected that the second four habits in the Interdependence dimension are foremost linked to Relatedness in the SDT framework, but also that Interdependence is positively linked to Autonomy and Competence through a strong mediation effect of Independence. This is also confirmed in section 4.2.

In order to measure the 7Habits we developed a pool of 28 items covering all 7 of the habits capturing the most important ideas from Covey's framework. Subsequently, we conducted a study to measure these 28 7Habits items and underwent a scale development process described in section 4.1. Hypothesis 2 was that a valid measurement tool can be developed from questionnaire items representing important ideas in the 7Habits framework. A 12 item 1 factor 7Habits scale emerged including items from all 7 of the habits with significant face validity. Items are listed in Table 2. This 12 item scale also demonstrated sufficient internal consistency and good model fit reached with confirmatory factor analysis. The successful creation of this 7Habits(12) scale provides further evidence to Hypothesis 1 because it shows that the 7Habits framework is suitable to be thought of as a unitary psychometric construct despites the complexities of the 7Habits. More elaborate and perhaps better measurement tools for the 7Habits are certainly possible to develop in the future. In this study we were content to use this 12 item scale as initial evidence of the 7Habits construct validity and based on this we went further to analyze the internal relationship of the 7Habits' dimensions to SDT basic needs as described in section 4.2. and to analyze the outcomes of the 7Habits in terms of established positive psychological resources as well as the discriminant validity or usefulness of the 7Habits construct.

It has already been expressed in detail how the application of the 7Habits is expected to increase basic need satisfaction (SDT), in fact, this mechanism is the basis on which we theorize that 7Habits is overall is a psychologically sound framework to enhance employee personal development. We further theorized that the 7Habits is positively related to other positive psychological resources and constructs such as PsyCap (that includes Hope, Efficacy, Resilience and Optimism) and Thriving at Work (which is composed of a vitality and a learning dimensions). Hypotheses 3 was that the 7Habits construct would be positively related to these established constructs was demonstrated based on the study we conducted and shown in Table 4.

In order to establish also the discriminant validity of 7Habits from the SDT at work construct, that is, to show that the 7Habits is distinct and useful on top of the established SDT measure we compared regression models with ANOVAs to see if the 7Habits construct predicts any variance of the PsyCap and Thriving as outcome variables even if we control for SDT. Our Hypotheses 4 was that the 7Habits significantly predicts both PsyCap and Thriving even after controlling for SDT. Table 5 shows our result confirming Hypotheses 4.

Limitations and future directions

The psychology of the 7Habits of Covey has not been captured in its full complexity in this paper. We aimed at finding a psychological theory that would overall support the unitary structure of the 7Habits. Future studies may focus on each habit and find narrower theories explaining – or even contradicting – specifics in Covey's work. Also due to our sample size (52), we were not able to develop multi-factor constructs of the 7Habits with confirmatory factor analysis. Larger sample size would enable more items and multi-factor solutions for the 7Habits construct that would in turn reflect more precisely Covey's framework. Also, no direct link to performance or satisfaction with work was tested in our study. The positive relationship between these and the 7Habits is assumed because of the mediation effect through PsyCap and Thriving at Work. Finally, despite discussion trainings and increased level of psychological resources, no trainings and no increased levels of any variable were observed as this paper focused on content validity and measurability of the 7Habits and only the statistical relationship of the 7Habits' with psychological resources was established.

Testing the effect of 7Habits trainings is the logical next step for future research after the theoretical and construct validity have been established in this paper.

Conclusion

In this paper we aim at looking at the Seven Habits of Highly Effective People (Covey, 1989) training material that has been widely popular as a corporate personal development training (CPDT) from a positive psychological perspective (Seligman and Csikszentmihalyi, 2000). We assumed that the primary psychological reason why CPDTs work is because such trainings stimulate positive psychological resources of the trainees which then in turn lead to increased performance and satisfaction with work. In the theoretical part of this paper we provided evidence that beyond the face validity of the 7Habits framework it is reasonable to expect the satisfaction of the three basic psychological needs that lead to increased selfdetermination (Deci and Ryan, 2000) with all its motivational and mental health benefits. To follow up the initial theoretical evidence, we also set out to develop and validate through a study a 12 item 7Habits measurement tool. The 7Habits construct that we created manifest good psychometric properties and acceptable content validity to measure personal effectiveness as it is conceived in Covey's work. Statistical analysis conducted based on the same study confirmed that the personal levels of the 7Habits are powerful predictors of established work-related psychological resources such as PsyCap and Thriving at Work even after controlling for the effect of basic need satisfaction (Self-Determination Theory). Our results provide initial evidence that the 7Habits of Covey is a psychologically meaningful training that can increase personal effectiveness and well-being. As we have shown, it is possible to bring to the fore the psychology behind CPDTs, and we argue that this is a worthwhile effort to pursue in the future. Studies focusing on the psychological foundations of corporate trainings would likely be a win-win (Habit 4) for the parties most concerned bringing psychological clarity to the best practices of business and large samples of working adults as well as new research opportunity for academia.

Covey's 7Habits and the Big Five Personality Traits: Cure for High Neuroticism?

Conference paper, Published: September 2020.

Szerdahelyi, M. & Komlósi, L. (2020): Covey's 7Habits and the Big Five Personality Traits: Cure for High Neuroticism?

Abstract

Stephen Covey's Seven Habits of the Highly Effective People is a long standing corporate training aiming at the broadly understood personal development of the participants including not just narrowly work-related attitudes but relationships, long term personal goals, personal integrity, developing a personal philosophy, and work-life balance in general for long lasting human effectiveness and success. Covey's practical guide has merits according to and fits well in the tradition of positive psychology. This was concluded in theoretical terms based on a recent study by Szerdahelyi and Komlósi (2020), moreover a 7Habits scale was developed and psychometrically validated. The authors in this new article take the next steps to look at the 7Habits from the point of view of the Big Five Personality Traits. Using multiple regression models, we mostly take an exploratory approach as to what relationships are significant statistically and relevant in terms of strength. Major expectations as to how personality traits may relate to the 7Habits are formally hypothesized, but in all cases, implications are drawn from the results and discussed also in practical training terms.

Keywords: Big Five Personality Traits, Corporate Trainings, Covey's 7Habits, Positive Psychology

Literature Review and Hypotheses Development

1.1. The 7Habits' content and related literature

The Seven Habits of the Highly Effective People by Stephen Covey (1989) was only recently put under the test of psychological coherency and psychometric validity. Szerdahelyi and Komlósi in their 2020 article explored the positive psychological basis,

measurement and outcomes of Covey's 7Habits. Previous peer reviewed literature on Covey's framework (Jackson, 1999; Mccabe, 2011; Starck, 1995; and Millar, 2013) avoided questions of compatibility between current psychological research and the 7Habits, also no measurement tool was reported in the literature. In their 2020 research paper Szerdahelyi and Komlósi showed that Self-determination theory (SDT) (Deci and Ryan, 2000) theoretically is compatible to Covey's framework, moreover, through the scale they developed and psychometrically validated they showed that the 7Habits are predictive of the basic need satisfaction scales of autonomy, competence and relatedness of SDT.

The 7Habits is a complex personality training accessible through training sessions or individual reading. In short we now recap the 7Habits content. Habit 1 is "Be proactive". Habit 1, as Covey put it in his talks, is about "realizing that each of us is the programmer of their lives". Habit 2 is "Begin with the end in mind". Habit 2 is about writing the program for ourselves that we want to run on. Habit 3 is "Put first things first". Habit 3 is running the program: executing. The first three Habits are part of what Covey calls Private Victory that leads to Independence. In our regression models we will not only focus on the 7Habits as a whole, but also on each Habit individually and also on Private Victory as a separate entity that aggregates Habit 1 to 3.

Habit 4 is "Think win-win". Is about the abundance mentality, that there is enough for both of us, thus enabling us to look also for the "win" of the other person. Habit 5 is "Seek first to understand then to be understood". This is the communication strategy of the 7Habits. You will better know what to do or say when you first understand the other, moreover other will be more inclined to be influenced by you if they first feel understood. Habit 6 is "Synergy with others". Looking for alternatives together that are better. Habit 7 is "Sharpen the saw". This is the maintenance Habit. In Covey's framework Habits 4 to 6 are aggregated in the Public Victory that leads to Interdependence, and Habit 7 stands alone. In our present research we group Habit 7 to the Public Victory for practical reasons because in the 12 item 7Habits scale Habit 7 is a relational item. In our regression models we focus on each Habit individually and also on Public Victory as a separate entity that aggregates Habit 4 to 7.

The Big Five Personality Traits and the 7Habits

The Big Five personality traits model of personality has been developed since the 80s and today it is the most prevalent psychological personality model that has massive psychometric evidence in support of (Rothmann and Coetzer, 2003). In this model the five personality traits are openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. In None of the dimensions are good or bad, rather, they describe personality and the individual mix of the traits is what counts. Extreme low or high values are regarded as problematic, but both high or low values can have advantages on any given dimension. Openness to experience is the dimension where inventiveness or curiousness (if high) and consistency or cautiousness (if low) are measured. Conscientiousness is the dimension where efficiency or organized personality (if high) and extravagancy or carelessness (if low) are measured. Extraversion is the dimension where outgoingness or energetic personality (if high) and solitary or reserved personality (if low) are measured. Agreeableness is the dimension where friendly or compassionate (if high) and challenging or callous (if low) personality is measured.

Neuroticism is the dimension where sensitive or nervous (if high) and resilient or confident (if low) personality is measured.

In our study we use the Rammstedt and John (2007) 10 item version of the Big Five inventory which is adequate to draw conclusions to the relationships of the personaliíty dimensions and other psychological variables also according to the literature critical of the short scales (Credé, Harms, Niehorster, Gaye-Valentine, 2012).

Personality traits and habits can be predictive of each other. In our research we focus on the question to what degree are personality traits predictive of the 7Habits as a whole and also of the individual Habits and also of Private and Public Victory all of which are elements of Covey's framework.

In general, we take an inquisitive or exploratory approach and we will draw conclusions based on all of the results of the linear regression models. Nevertheless, we take care to formulate three formal hypothesis that highlight our general expectations about the results of the 45 regression models that we run.

We expect that when the complex 7Habits variable is put in relation to the five personality dimensions neuroticism will be inversely predictive while the other dimensions excluding Extraversion will be predictive of the 7Habits. This is because the content of the 7Habits

implies orderliness, and openness, trust towards others, while the outgoingness and sociability don't seem to be an intensively related dimension.

Hypothesis 1: The 7Habits latent variable is positively related to Agreeableness, Conscientiousness and Openness while negatively related to Neuroticism.

We expect that when Habits 1 to 3 and the Private Victory variables are put in relation to the five personality dimensions Conscientiousness will be the most relevant predictor. This is conscientiousness seems to be central to the first three habits.

Hypothesis 2: Private Victory and related Habits dominantly will be positively related to conscientiousness.

We expect that when Habits 4 to 7 and the Public Victory variables are put in relation to the five personality dimensions the socially relevant traits that is Extraversion, Agreeableness and Openness will be the most relevant predictors.

Hypothesis 3: Public Victory and related Habits dominantly will be positively related to Extraversion, Agreeableness and Openness.

Method

The 7Habits construct (Szerdahelyi and Komlósi, 2020) and the Big Five personality traits were measured and linear regression was used to determine their relationship. Following Covey's original framework the we created two subgroups within the 12 item 7Habits scale which are called Private Victory and Public Victory. Also, the items belonging to each Habit were grouped separately (as per Table 1). For each group we run five regression models separately for each personality dimension in order to get a multilayered view of the relationships between the personality and the 7Habits. Figure 1 represents the created groups. Although the 7Habits construct loads all 12 items on a single 7Habits latent variable (Szerdahelyi and Komlósi, 2020), it seemed appropriate to proceed with the grouping of the items representing different elements in Covey's framework and create regression models for each. The regression models indicate the strength (R2), direction

(beta) and statistical significance (p) of the relationship of the variables, which are discussed in the Discussion session.

Computations are executed with R statistical software (R core team, 2017)

The Seven Habits							
Private Victory Public Victory							
Habit 1	Habit 2	Habit 3	Habit 4	Habit 5	Habit 6	Habit 7	

Figure 1: The 7Habits framework (Source: The authors' creation)

Sample

For this study we used the same data set that was used to develop the 7Habits scale (Szerdahelyi and Komlósi, 2020). This sample was described as follows. "The Budapest office of the tech company comprises in total 58 people (31 male and 27 female employees). A total of 53 people were knowledge-workers in the fields of IT and business. HR, finance and assistance make up 5 people. Given the relatively small sample size, no distinction was made between areas of responsibility within the employee survey. Although the surveys were not obligatory, management recommended highly to participate, therefore 52 people (~90%) filled in the employee survey. The final sample size for the analysis was 52."

Measures

For all survey questions a 6 point Likert-like scale was used where 1 meant "Strongly disagree" and 6: "Strongly agree". Questionnaires were combined and taken together by the participants.

The seven habits. Covey's framework was measured with the 7Habits 12 item scale that was developed by the authors of this paper in a previous study (Szerdahelyi and Komlósi, 2020). The 12 items of the scale were deduced with content and psychometric analysis to be reasonably representative of the whole 7Habits framework and also to show acceptable psychometric quality. All 12 items load on one 7Habits latent variable indicating a good fit in confirmatory factor analysis (Hu and Bentler, 1999), but items are grouped according to content to represent each Habit as shown in Table 1. As per Covey's framework the Habits themselves are grouped into Private Victory representing Habits 1 to 3 and Public Victory

representing Habits 4 to 7. The grouping per Habits and Victory level also used as separate entities in the linear regression models are derived based on content only while psychometrically not forming a separate latent unit in the 12 item 7Habits construct. In the future, more detailed 7Habits scales may be necessary to prove or disprove whether the Habits and the Victory levels on Covey's framework make separate psychometric sense or not.

Item	Item text / Habit
No.	
	1. Be proactive
1	I focus on things that have an impact
2	I feel responsible for what I do and don't do
	2. Begin with the end in mind
3	Before starting something new, I think about how it helps me achieve my goals
4	I feel motivated by my goals
	3. Put first things first
5	I start with the difficult tasks that have the most added value
6	I am often overwhelmed by urgent tasks and requests (R)
	4. Think win-win
7	I am open and clear about what I need and what I can do for others
8	I believe that life is full of opportunities for everybody
	5. Seek first to understand then to be understood
	While listening to somebody I am already thinking about what my response will
9	be (R)
10	I make sure that the other person feels understood by me
	6. Synergy with others
11	I build on the strengths of others to get something done
	7. Sharpen the saw
12	I engage in lasting relationships and friendships

Table 2: Items of the 7Habits scale (Source: The authors' creation)

The Big Five Personality Traits. We used the Rammstedt and John (2007) short version of the Big Five Inventory which has 2 items for each trait. This short scale shows respectable

integrity and is acceptable to be used to detect relationships or distinctness of the Big Five traits even according to the critical literature on short personality scales (Credé, Harms, Niehorster, Gaye-Valentine, 2012).

Independent variables	beta	se	t	F	df	р	R2
Extraversion on the 7Habits	.091	.044	2.044	4.179	1, 49	.046	.078
Agreeableness on the 7Habits	.170	.037	4.60	21.18	1, 49	.000	.301
Conscientiousness on the 7Habits	.141	.039	3.542	12.55	1, 49	.000	.203
Neuroticism on the 7Habits	-0.218	.043	-4.981	24.81	1, 49	.000	.336
Openness on the 7Habits	.122	.048	2.549	6.499	1, 49	.013	.117
Extraversion on Private Victory	.382	.246	1.549	2.4	1, 49	.127	.027
Agreeableness on Private Victory	.879	.234	3.748	14.05	1, 49	.000	.222
Conscientiousness on Private Victory	0.942	.227	4.137	17.12	1, 49	.000	.258
Neuroticism on Private Victory	-0.781	.189	-4.119	-4.119	1, 49	.000	.257
Openness on Private Victory	.373	.224	1.66	2.755	1, 49	.103	.053
Extraversion on Public Victory	.473	.224	2.113	4.465	1, 49	.039	.083
Agreeableness on Public Victory	.887	.211	4.194	17.59	1, 49	.000	.264
Conscientiousness on Public Victory	.501	.234	2.137	4.568	1, 49	.037	.085
Neuroticism on Public Victory	.760	.172	-4.405	19.41	1, 49	.000	.283
Openness on Public Victory	.582	.197	2.951	8.708	1, 49	.004	.15
Extraversion on Habit 1	.117	.096	1.221	1.492	1, 49	.227	.02
Agreeableness on Habit 1	.2367	.096	2.442	5.965	1, 49	.018	.108
Conscientiousness on Habit 1	.420	.082	5.098	25.99	1, 49	.000	.346
Neuroticism on Habit 1	-0.284	.074	-3.82	14.59	1, 49	.000	.229
Openness on Habit 1	.023	.089	.268	.071	1, 49	.789	.001
Extraversion on Habit 2	.136	.143	.953	.908	1, 49	.345	.018
Agreeableness on Habit 2	.517	.132	3.895	15.17	1, 49	.000	.236
Conscientiousness on Habit 2	.273	.145	1.875	3.515	1, 49	.066	.066
Neuroticism on Habit 2	-0.333	.116	-2.866	8.214	1, 49	.006	.143
Openness on Habit 2	.132	.130	1.013	1.026	1, 49	.316	.020
Extraversion on Habit 3	.128	.095	1.351	1.826	1, 49	.182	.035
Agreeableness on Habit 3	.125	.1	1.247	1.554	1, 49	.218	.03
Conscientiousness on Habit 3	.248	.095	2.607	6.799	1, 49	.012	.121
Neuroticism on Habit 3	.163	.081	-2.011	4.043	1, 49	.049	.076
Openness on Habit 3	.217	.083	2.613	6.828	1, 49	.011	.122
Extraversion on Habit 4	.109	.1	.096	.202	1, 49	.278	.023
Agreeableness on Habit 4	.306	.097	.15	9.921	1, 49	.002	.168
Conscientiousness on Habit 4	.154	.103	1.488	2.215	1, 49	.143	.043
Neuroticism on Habit 4	-0.329	.074	-4.415	19.5	1, 49	.000	.284
Openness on Habit 4	.128	.09	1.41	1.987	1, 49	.165	.0389
Extraversion on Habit 5	.131	.109	1.199	1.437	1, 49	.236	.028
Agreeableness on Habit 5	.199	.113	1.755	3.078	1, 49	.085	.059
Conscientiousness on Habit 5	.219	.112	1.956	3.826	1, 49	.056	.072
Neuroticism on Habit 5	-0.285	.087	-3.251	10.57	1, 49	.002	.177
Openness on Habit 5	.164	.098	1.667	2.778	1, 49	.101	.053
Extraversion on Habit 6	.003	.087	.045	.002	1, 49	.964	.000
Agreeableness on Habit 6	.165	.089	1.86	3.461	1, 49	.068	.065
Conscientiousness on Habit 6	-0.076	.090	-0.838	.702	1, 49	.406	.014
Neuroticism on Habit 6	-0.057	.075	-0.763	.582	1, 49	.448	.011
Openness on Habit 6	.084	.079	1.071	1.147	1, 49	.289	.022
Extraversion on Habit 7	.228	.069	3.271	10.7	1, 49	.001	.179
Agreeableness on Habit 7	.215	.075	2.871	8.242	1, 49	.006	.144
Conscientiousness on Habit 7	.203	.075	2.705	7.319	1, 49	.009	.13
Neuroticism on Habit 7	-0.087	.066	-1.329	1.766	1, 49	.19	.034
Openness on Habit 7	.204	.064	3.188	10.16	1, 49	.002	.171

Table 2: Regression Analysis of Big Five personality traits on the 7Habits (Source: The authors' creation)

Results

In the Results section we detail the results of the linear regression models that we run in order to calculate the strength of the relationships between the Big Five personality traits and the 7Habits construct. The 7Habits is measured as one latent variable on which the12 items load and these items are representative of the 7 habits. In order to follow the logic of Covey's framework and be able to deduce meaningful conclusions per Habit and per Private Victory (including Habit 1 to 3) and the per Public Victory (including Habit 4 to 7), we run linear regressions for each subcomponent of the 7Habits construct.

The Big Five Personality Traits and the 7Habits as a whole

We first tested the models measuring the relationship between the 12 item 7Habits construct and each of the Big Five traits. The linear regression model measuring the effect of Extraversion on the 7Habits is beta .091, se .044, t 2.044, F 4.179 and R2 .078 with significance level p .046. That of Agreeableness on the 7Habits is beta .170, se .037, t 4.60, F 21.18 and R2 .301 with significance level p .000. Conscientiousness on the 7Habits has an effect of beta .141, se .039, t 3.542, F 12.55 and R2 .203 with significance level p .000. While the effect of Neuroticism on the 7Habits is beta -0.218, se .043, t -4.981, F 24.81 and R2 .336 with significance level p .000. Finally, the effect of Openness on the 7Habits is beta .122, se .048, t 2.549, F 6.499 and R2 .117 with significance level p .013.

The Big Five Personality Traits and the Privat Victory

Second, we tested the models measuring the relationship between Private Victory – making up the first 6 items of the 7Habits construct including Habits 1 to 3 – and each of the Big Five traits. The linear regression model measuring the effect of Extraversion on Private Victory is beta .382, se .246, t 1.549, F 2.4 and R2 .027 with significance level p .127. That of Agreeableness on Private Victory is beta .879, se .234, t 3.748, F 14.05 and R2 .222 with significance level p .000. Conscientiousness on Private Victory has an effect of beta 0.942, se .227, t 4.137, F 17.12 and R2 .258 with significance level p .000. While the effect of Neuroticism on Private Victory is beta -0.781, se .189, t -4.119, F -4.119 and R2 .257 with

significance level p .000. Finally, the effect of Openness on Private Victory is beta .373, se .224, t 1.66, F 2.755 and R2 .053 with significance level p .103.

The Big Five Personality Traits and the Public Victory

Third, we tested the models measuring the relationship between Private Victory – making up the last 6 items of the 7Habits construct including Habits 4 to 7 – and each of the Big Five traits. The linear regression model measuring the effect of Extraversion on Public Victory is beta .473, se .224, t 2.113, F 4.465 and R2 .083 with significance level p .039. That of Agreeableness on Public Victory is beta .887, se .211, t 4.194, F 17.59 and R2 .264 with significance level p .000.

Conscientiousness on Public Victory has an effect of beta .501, se .234, t 2.137, F 4.568 and R2 .085 with significance level p .037. While the effect of Neuroticism on Public Victory is beta .760, se .172, t -4.405, F 19.41 and R2 .283 with significance level p .000. Finally, the effect of Openness on Public Victory is beta .582, se .197, t 2.951, F 8.708 and R2 .15 with significance level p .004.

The Big Five Personality Traits and Habit 1: Be proactive

Then, we tested the models measuring the relationship between each Habit and the Big Five traits. The linear regression model measuring the effect of Extraversion on Habit 1 is beta .117, se .096, t 1.221, F 1.492 and R2 .02 with significance level p .227. That of Agreeableness on Habit 1 is beta .2367, se .096, t 2.442, F 5.965 and R2 .108 with significance level p .018. Conscientiousness on Habit 1 has an effect of beta .420, se .082, t 5.098, F 25.99 and R2 .346 with significance level p .000. While the effect of Neuroticism on Habit 1 is beta -0.284, se .074, t -3.82, F 14.59 and R2 .229 with significance level p .000. Finally, the effect of Openness on Habit 1 is beta .023, se .089, t .268, F .071 and R2 .001 with significance level p .789.

The Big Five Personality Traits and Habit 2: Begin with the end in mind

The linear regression model measuring the effect of Extraversion on Habit 2 is beta .136, se .143, t .953, F .908 and R2 .018 with significance level p .345. That of Agreeableness on Habit 2 is beta .517, se .132, t 3.895, F 15.17 and R2 .236 with significance level p .000. Conscientiousness on Habit 2 has an effect of beta .273, se .145, t 1.875, F 3.515 and R2

.066 with significance level p .066. While the effect of Neuroticism on Habit 2 is beta -0.333, se .116, t -2.866, F 8.214 and R2 .143 with significance level p .006. Finally, the effect of Openness on Habit 2 is beta .132, se .130, t 1.013, F 1.026 and R2 .020 with significance level p .316.

The Big Five Personality Traits and Habit 3: Put first things first

The linear regression model measuring the effect of Extraversion on Habit 3 is beta .128, se .095, t 1.351, F 1.826 and R2 .035 with significance level p .182. That of Agreeableness on Habit 3 is beta .125, se .1, t 1.247, F 1.554 and R2 .03 with significance level p .218. Conscientiousness on Habit 3 has an effect of beta .248, se .095, t 2.607, F 6.799 and R2 .121 with significance level p .012. While the effect of Neuroticism on Habit 3 is beta .163, se .081, t -2.011, F 4.043 and R2 .076 with significance level p .049. Finally, the effect of Openness on Habit 3 is beta .217, se .083, t 2.613, F 6.828 and R2 .122 with significance level p .011.

The Big Five Personality Traits and Habit 4: Think win-win

The linear regression model measuring the effect of Extraversion on Habit 4 is beta .109, se .1, t .096, F .202 and R2 .023 with significance level p .278. That of Agreeableness on Habit 4 is beta .306, se .097, t .15, F 9.921 and R2 .168 with significance level p .002. Conscientiousness on Habit 4 has an effect of beta .154, se .103, t 1.488, F 2.215 and R2 .043 with significance level p .143. While the effect of Neuroticism on Habit 4 is beta -0.329, se .074, t -4.415, F 19.5 and R2 .284 with significance level p .000. Finally, the effect of Openness on Habit 4 is beta .128, se .09, t 1.41, F 1.987 and R2 .0389 with significance level p .165.

The Big Five Personality Traits and Habit 5: Seek first to understand then to be understood

The linear regression model measuring the effect of Extraversion on Habit 5 is beta .131, se .109, t 1.199, F 1.437 and R2 .028 with significance level p .236. That of Agreeableness on Habit 5 is beta .199, se .113, t 1.755, F 3.078 and R2 .059 with significance level p .085. Conscientiousness on Habit 5 has an effect of beta .219, se .112, t 1.956, F 3.826 and R2 .072 with significance level p .056. While the effect of Neuroticism on Habit 5 is beta -0.285, se .087, t -3.251, F 10.57 and R2 .177 with significance level p .002. Finally, the effect of

Openness on Habit 5 is beta .164, se .098, t 1.667, F 2.778 and R2 .053 with significance level p .101.

The Big Five Personality Traits and Habit 6: Synergize with others

The linear regression model measuring the effect of Extraversion on Habit 6 is beta .003, se .087, t .045, F .002 and R2 .000 with significance level p .964. That of Agreeableness on Habit 6 is beta .165, se .089, t 1.86, F 3.461 and R2 .065 with significance level p .068. Conscientiousness on Habit 6 has an effect of beta -0.076, se .090, t -0.838, F .702 and R2 .014 with significance level p .406. While the effect of Neuroticism on Habit 6 is beta -0.057, se .075, t -0.763, F .582 and R2 .011 with significance level p .448. Finally, the effect of Openness on Habit 6 is beta .084, se .079, t 1.071, F 1.147 and R2 .022 with significance level p .289.

The Big Five Personality Traits and Habit 7: Sharpen the saw

The linear regression model measuring the effect of Extraversion on Habit 7 is beta .228, se .069, t 3.271, F 10.7 and R2 .179 with significance level p .001. That of Agreeableness on Habit 7 is beta .215, se .075, t 2.871, F 8.242 and R2 .144 with significance level p .006. Conscientiousness on Habit 7 has an effect of beta .203, se .075, t 2.705, F 7.319 and R2 .13 with significance level p .009. While the effect of Neuroticism on Habit 7 is beta -0.087, se .066, t -1.329, F 1.766 and R2 .034 with significance level p .19. Finally, the effect of Openness on Habit 7 is beta .204, se .064, t 3.188, F 10.16 and R2 .171 with significance level p .002.

Discussion

45 linear regression models have been run on the 7Habits and the component groups defined as Private and Public Victory and as the 7 Habits. Our general expectations are confirmed, but there are also surprising results which highlight opportunities or betray the weaknesses of the scales applied.

Looking at the models where the 7Habits construct as a whole was predicted by the five personality dimensions all came out as statistically significant although not all very relevant in terms of degree or strength. Extraversion was the weakest predictor as per our hypothesis, although still significant. Neuroticism curiously came out as the dominant predictor of the 7Habits followed closely by Agreeableness. Neuroticism is inversely related to the 7Habits variable which means that the lower the Neuroticism trait the higher the 7Habits variable in general on our sample. This is true for most levels of analysis to follow. The conclusion to discuss in terms of training and practice is that maybe people high on Neuroticism could be helped by practicing the Seven Habits, provided that we assume that the relationship is reversable in practice and good habits can help to compensate for high Neuroticism trait. Agreeableness is also surprisingly the second most powerful predictor of the 7Habits, whereas it was assumed that it would be mostly predictive of Public Victory and related Habits.

Looking at the models where the Private Victory (encompassing the Habits of Independence) was predicted by the five personality dimensions only three came out as statistically significant. Conscientiousness was expected to be the most powerful predictor, which is so, but only by a negligible margin: Neuroticism inversely is almost as predictive, while curiously Agreeableness is also strongly predictive.

Looking at the models where the Public Victory (encompassing the Habits of Interdependence) was predicted by the five personality dimensions all came out as statistically significant, however curiously extraversion is the least important predictor. Conscientiousness is also very weak, however this was expected. According to the pattern so far observed, Neuroticism is the strongest predictor (inversely) of the Public Victory, followed by Agreeableness and finally by Openness to experience.

We also run regression models for each of the Habits. In Hypothesis 2 we suggested that for Habits 1 to 3 Conscientiousness would be the dominant predictor. In the case of Habit 1 (Be proactive!) this is clearly so with Neuroticism (reversed effect) being in the second place. In the case of Habit 2 (Begin with the end in mind) however Conscientiousness is not a strong predictor. Agreeableness is the leading predictors, while Neuroticism is also significant. This result doesn't seem to fit with theory about the personality traits or the 7Habits, therefore it is either reflective of a measurement error or implies the inadequacy of the 7Habits items referring to Habit 2. As for Habit 3 (Put first things first) Conscientiousness and Openness are equally (and neither of them very strongly) predicting of the Habit. The former is according to our Hypothesis 2 and the latter is an interesting additional finding.

As for Habit 4 (Think Win-Win), Neuroticism is the strongest (invers) predictor according to the trend discovered across most regression models. Agreeableness as per our

Hypothesis 3 is also a rather strong predictor, however Extraversion and Openness are not significant. As for Habit 5 (Seek first to understand and then to be understood) only the invers effect of Neuroticism is statistically significant contrary to Hypothesis 3. Habit 6 (Synergize with others) didn't have any significant predictors as per our regression models. Habit 7 (Sharpen the saw) which in the case of the 12 item 7Habits scale is really about the quality of relationships, is as per Hypothesis 3 showing as predictors Extraversion, Agreeableness and Openness.

Results indicate that people low in Neuroticism and high in Conscientiousness and Agreeableness will be better at the 7Habits while Extraversion and Openness have less to do with the Habits. Assuming the premise that the relationship is reversable in the sense that by practicing the Habits one can compensate for certain low personality traits, the Seven Habits training and practicing the Habits could compensate for lower levels of Conscientiousness, Agreeableness and higher levels of Neuroticism. The strongest and most consistent predictor of the Habits was Neuroticism in reverse, therefore from a personality perspective practicing the Habits may be come most handy for those who are high in Neuroticism.

Limitations and Conclusions

The 45 regression models run on the 12 7Habits items and the Big Five personality traits revealed to a large extent the predicted relationships while as a major surprise came that Neuroticism was with few exceptions the top predictor of the 7Habits and its components. From a training and personality perspective, the practicing or learning about the Seven Habits may be most helpful to those who would like to compensate for low Conscientiousness and low Agreeableness and high Neuroticism. Results also indicate that those already high in Conscientiousness and Agreeableness and low in Neuroticism will do best in practicing the Seven Habits. The personality traits Extraversion and Openness are less related to the Habits. Certain relationships resulting from the regression models are not compatible with the theory of Seven Habits and the personality traits, therefore they either indicate a measurement error or the deficiency of the 7Habits scale. Both of these points are reflective of the limitations of this paper and are opportunities for future research. On the one hand larger sample sizes allow for more reliable measurements, on the other hand a more elaborate 7Habits scale is probably possible to develop with more items that would capture more of the content of the Seven Habits and would allow for a each of the Habits (or at least

each group of Habits) to load on separate latent variables at factor analysis. A more complete 7Habits measurement tool may allow for more precise results when put in relation to the Big Five Personality Traits.

Development of the SDLR9 Measurement Tool and Evidence for a Second Order Latent Construct of Self-Directed Learning Readiness in Virtual Teams in Hungary

Working paper

Kupa, K., Szerdahelyi, M.J. and Komlósi, L. I. (2022): Development of the SLDR9 Measurement Tool and Evidence for a Second Order Latent Construct of Self-Directed Learning Readiness in Virtual Teams in Hungary, Working paper

Abstract

In this paper we approach the development of virtual teams from the individuals' perspective by extending the theory of self-directed learning (SDL) beyond the extant research in nursing education and applying it to a sample of adult population working in virtual teams in Hungary. After finding the necessary theoretical steps to connect SDL with virtual teams, we conducted a study with the intent to validate existing instruments or, if this is not possible, to develop a new SDL instrument for virtual teams. Our results confirm the viability of the SDL theories in the context of teams working remotely much of the time. While we could not confirm confidently the validity of the known SDLR instruments developed for nursing education on our sample of working adults in virtual teams, we have found support for the conventional three factor self-directed learning readiness (SDLR) construct with a reduced item number. In the current paper we advance a new measurement tool called the SDLR9 which, while mirroring the three original factors known in the extant literature, also points to a higher order latent SDLR variable.

Keywords: individual learning, self-directed learning readiness, team development, virtual teams, SLDR9

JEL classification: D83, M14, M16, M53

Introduction

Virtual teams – especially after the onset of the pandemic – became integral parts of several organisations. Tasks and processes that companies believed could not be performed

remotely were proved to be suitable to be executed away from the office, even from one's own home. However, there have been theories and academic articles about virtual teams for several decades now. As Bell and Kozlowski wrote in their famous article: "Virtual teams are here, and they are here to stay" (Bell and Kozlowski, 2002, p. 45).

When it comes to virtual teams, there are several aspects how team development and learning can be analysed. Such aspects can be organisational, leadership, team, individual and many more. At the individual level it should be analysed how the individual attributes and personality traits can contribute to the success of their learning, which of these influence directly the process of team development. In this paper, we are analysing how the concept of self-directed learning (SDL) and the model by Fisher et al. (2001) of SDL readiness scales (SDLSR) could be applied or adapted to virtual teams. The goal of this research is to test the results of a data collection performed in Hungary on a sample of 200 adults working in virtual teams and either confirm the applicability of the original 40-item SDLRS scale of Fisher et al. (2001) or develop our own SDLRS model through confirmatory and exploratory factor analysis and internal consistency measures.

In this article we summarize the theoretical background of virtual teams, SDL and SDLRS (Section 2-3), provide an overview about the methods of the data collection and the statistical analysis (Section 4) and discuss the empirical findings of our data analysis and proposed SDLRS model (Section 5-6) and provide our conclusions in (Section 7).

Virtual Teams

When discussing virtual teams, first the definition of teams in the traditional sense should be introduced. Cohen and Bailey (1997) defined team as a set of individuals, who are seen as a complete social entity (e.g., department, corporation) and are jointly responsible for the outcomes of the tasks they independently perform to reach a common goal. The members are working together, they use their different skills and provide support to each other, sometimes meshing their functions to reach the goal of the team. According to Berry (2011) teams generally have four attributes, which are common amongst all teams:

- The team has a shared membership mindset, and usually has a definable and limited membership
- The team members function independently with a shared purpose which is either constructed by the team or was given for them

- The team members are jointly responsible for the outcomes
- The team members manage their relationships across and between organisational boundaries collectively

Virtual teams have the same basic concept as traditional teams: they are a set of individuals sharing the responsibility to perform tasks as a complete social entity. However, there are two additional attributes of virtual teams, that should be added to the characteristics of traditional teams (Berry, 2011):

- The team members may be geographically dispersed
- The team members mostly rely on computer-mediated communication rather than face-to-face communication

Virtual teams do not differ from the previously introduced traditional team in their purposes or goals, only their ways of working, i.e., using IT and communication technologies and the fact that the team members are necessarily not located in the same office (in many cases not even in the same continent) or the face-to-face meetings are not necessary or possible during the execution of their tasks. (Bell–Kozlowski, 2002). The technology-mediated nature of virtual teams is present in several studies, noting that without technology teams cannot have a virtual nature (Lipnack–Stamps, 2000; Kupa, 2020a).

The virtual nature of these teams is a complex and multidimensional construct since, even if there are two teams, using the same technology, the extent to which the technology is used defines which of them (if either) can be considered as a virtual team. Nowadays every team uses technology to a certain extent. Emails and other video and chat applications have become significant communication tools in almost all teams. Thus, for the sole reason that a team uses emails and Zoom, the virtual nature cannot be defined as these could also define a team that conducts only certain activities virtually – i.e., uses emails for tracking purposes, chats in the loud office, etc. This means that almost every team adopts some virtualness in its nature, but for the purposes of qualifying as a virtual team, technology is not enough, without the geographical dispersion these teams cannot be considered virtual. (Berry, 2011; Kupa, 2020a)

The past two decades have brought significant growth in the use of virtual teams, with its peak being reached in 2020 due to the coronavirus pandemic. According to Gartner (2020) 88 per cent of global organisations encouraged their employees to work from home since the beginning of 2020, irrespective of whether they were affected by the virus or not. 97 per cent

of organisations decided to cancel business related travel, thus making it impossible to conduct face-to-face meetings in virtual teams. Bakonyi and Kiss-Dobronyi (2020) conducted a survey in Hungary, where 73 per cent of the participants responded that they had been asked by their employers to work from home for a certain period. This shows that the significance of virtual teams has increased even further, however longer-term effects of the COVID19 peaks is yet to be determined. What can be seen is that despite of the current pandemic, the number of virtual teams deployed by companies have been growing for some time due to globalisation, innovation, and better access to infrastructure.

There are several reasons why companies opted for setting up virtual teams within their organisations. The benefits arising with virtual teams are, amongst others, flexibility, cost efficiency, better utilisation of time and space, and maximising expertise of the globally dispersed talent pool. At the same time, these benefits pose several challenges to teams, such as overcoming a lack of personal connections, different cultural backgrounds, language barriers and technological issues (Kupa, 2020a). The leader's role is to help the team overcome these challenges and, at the same time, exploit the benefits and opportunities. Besides these, the focus of the leaders should be on performance management and team development and learning. However, due to the lack of face-to-face interactions, the latter is difficult to perform (Bell and Kozlowski, 2001) and requires the willingness and positive attitude of the individual team members.

Learning is part of all stages of team development; however, it is often hindered when using various virtual tools for communication that is present in virtual teams. Zakaria et al. (2004) noted that since learning is not purely based on verbal or written communication, the lack of face-to-face contact, i.e., the limited number of non-verbal clues decreases the chance of success of the team's learning activities. In this sense, the individuality becomes even more significant in virtual teams when it comes to learning – the individuals must be ready and able to search for and process information independently and, at the same time, effectively. The self-directed learning readiness – as discussed in the next chapter – is a good indicator to assess this individuality and – if adapted correctly – could help leaders in developing efficient teams.

Self-Directed Learning

Self-Directed Learning theories

Learning is a major focus of several disciplines, however, there is a difficulty in establishing a single satisfactory definition due to the different perspectives each discipline adopts. The most common definition describes learning as a change in behaviour due to previous experiences. (Barron et al., 2015) In organisations and teams, this is not different: former experience can be decisively present in online training, or in reading books, talking to co-workers, or solving problems and finding the solutions.

In the case of virtual teams, the limitations of learning are due to the lack of face-to-face contact. Although more explicit knowledge is easier to pass on, learning often draws on tacit knowledge, which, thus, is much more challenging. Due to these limitations, there is a growing need in virtual teams for individuality and independency when it comes to learning. Self-directed learning (SDL) and self-regulated learning (SRL) focus on how the individuals approach their individual learning, what strategies they set, and how they manage their own learning. In this study the term SDL will be used to describe this phenomenon. (Kupa, 2020b)

SDL is defined by these learning strategies individuals take to achieve their learning goals. This includes identifying and assessing their training and learning needs, setting objectives, evaluating their performance and the outcomes of their learning activities. In SDL individuals take the initiative, they do not depend on others to tell them how to approach learning, they are able to formulate their own goals and overall can be trusted with managing their time and resources as well. Of course, SDL differs in pedagogical research and team research, since the environment and structure of the learning is different: in education there is a set curriculum, there are classes available, however in an on-the-job team environment the individuality and ownership is much more significant. (Knowles, 1975; Kupa, 2020b)

Though the individuality and independency are the core attributes of SDL, both Greg (1993) and Garrison (1997) argued that SDL could also enable corporations and teams to utilise peers, members or anyone who can be considered as a learning resource to enhance the effectiveness of learning. Some prominent studies (Chicchinelli et al., 2018; Pardo et al., 2016) have also found correlations between SDL and academic outcomes of students. SDL can be used for enhancing both private and professional knowledge irrespective of institutional, geographical, or situational differences (Abdullah et al., 2008), which also

confirms its importance in virtual team settings. With the rapid improvement in diverse technology, online and virtual learning tools are readily available for learners. These are frequently used in virtual teams as well. (Kupa, 2020b)

When it comes to further classification of SDL, there are several approaches and divisions of domain. According to Barnard-Brak et al. (2010) self-regulated learning skills include goal setting, time management, task strategies and environment structuring. Later this was extended with mood adjustment, self-evaluation, and help-seeking by Hong et al. (2021). Another classification – which will be the focus of this paper – is based on Guglielmino's (1997) Self-Directed Learning Readiness Scale, which was later adjusted and adapted by Fisher et al (2001). In Fisher's analogy, there are three main domains of SDL: self-management, self-control, and desire for learning. Self-management refers to the ability of the learners to identify their needs, set their goals, and allocate their energy and time to learning. Self-control refers to the independency of the SDL learners, meaning that the learner is an independent individual, capable of analysing, planning, implementing, and assessing their learning activities independently. Desire for learning refers to the strong motivation of learners to acquire knowledge (Fisher et al., 2001; Kupa, 2020b).

SDL Measurements

There are several instruments that have been developed to measure SDL, such as the Self-Directed Learning Readiness Scale (Guglielmino, 1997), which is one of the first instruments to measure self-direction in learning and has been validated in several academic studies. One of these is the Self-Directed Learning Readiness Scale for Nursing Education (SDLRSNE) (Fisher et al., 2001), which is an adaptation of Guglielmino's SDLRS for the nursing education sector, and it has been validated in several academic studies.

Similar instruments are the Self-Directed Learning Instrument (SDLI) (Cheng et al., 2010) and the Self-Rating Scale of Self-Directed Learning (SRSSDL) (Williamson, 2007). These instruments have also been translated into various languages and adapted for different scenarios, authenticating the scientific interest for this type of measure through several applications – but mostly in pedagogical research. Of course, there are several limitations to these measures, when it comes to validity, reliability, and repeatability. This paper focuses on the validity of the SDL measures (specifically the SDLRSNE as discussed in Section 3.3), however it should be noted that due to the niche field the validation, reliability and

repeatability studies focused on (education, nursing), there is a need for these measures to be further tested in this these fields and adapted to other environments, markets, and conditions. Furthermore, the reliability of the SDLRS scales, whether they test the general attitude towards learning or the self-directed nature of the learning is also a factor to be considered in future research.

Fisher's SDLRSNE

Fisher et al. (2001) took the available literature and compiled a list of attitudes, abilities, and personality characteristics of self-directed learners. The complete list consisted of 93 items among which a significant number of items were drawn from other SDLR scales such as Guglielmino's (1997), Knowles's (1975) or Candy's (1991) measurements. The Delphi technique was used to gain consensus amongst the characteristics required for SDL through an expert panel. For an item to be retained at least 80 per cent consensus had to be achieved. (Fisher et al., 2001).

Out of the 93 items brought to the panel, 40 items remained after the principal component analysis and factor analysis. These items were divided into three subscales as follows (Fisher et al., 2001):

Self-Management:

- I manage my time well
- I am self-disciplined
- I am organized
- I set strict time frames
- I have good management skills
- I am methodical
- I am systematic in my learning
- I set specific times for my study
- I solve problems using a plan
- I prioritize my work
- I can be trusted to pursue my own learning
- I prefer to plan my own learning
- I am confident in my ability to search out information

Desire for Learning:

- I want to learn new information
- I enjoy learning new information

- I have a need to learn
- I enjoy a challenge
- I enjoy studying
- I critically evaluate new ideas
- I like to gather the facts before I make a decision
- I like to evaluate what I do
- I am open to new ideas
- I learn from my mistakes
- I need to know why
- When presented with a problem I cannot resolve, I will ask for assistance

Self-Control:

- I prefer to set my own goals
- I like to make decisions for myself
- I am responsible for my own decisions/actions
- I am in control of my life
- I have high personal standards
- I prefer to set my own learning goals
- I evaluate my own performance
- I am logical
- I am responsible
- I have high personal expectations
- I am able to focus on a problem
- I am aware of my own limitations
- I can find out information for myself
- I have high beliefs in my abilities
- I prefer to set my own criteria on which to evaluate my performance

Fisher et al. (2001) aimed that this scale be used in nursing education, to assist nurse educators in diagnosing their students' learning needs and thus implement teaching strategies that best suit the students' needs. Due to the generic wording of the questions, however, the questionnaire could be used not only for nursing educators or specifically in education, but to support virtual teams in their learning path.

Fisher and King (2010) re-visited the SDLRSNE to provide evidence of construct validity for the subscales. This exercise resulted in making 11 items from the list redundant, while keeping the factor structure similar. For the purposes of this study the original 40 item list was chosen and will be the base for further analysis.

The aim of the present study is to bring together the theories of virtual teams and those of self-directed learning to provide a resource which plays a significant role in the success of the team pertaining to the individuals. Through data collected among adult working population and extensive statistical analysis, our goal is to gather supportive evidence for the applicability of self-directed learning readiness beyond student populations and to confirm that the original or a modified version of the SDLRSNE scale is applicable in virtual teams. If such confirmation is not possible, then to explain the differences in terms of the context.

Method

The 40-item SDLRSNE developed by Fisher et al. (2001) was chosen to be in the focus of the study to test whether the same scale and factor structure could be applied for virtual teams. The SDLRSNE has been chosen to be the instrument tested as it had been validated several times and the wording of the 40 statements is simple enough to be understood for those who speak English as their second language. The original English questionnaire was peer-reviewed by a panel of Hungarian PhD students at the Széchenyi István University, who are both academic and business professionals. Based on this exercise, the questionnaire was administered with the original 40 items in English for data collection purposes. Although Fisher and King (2010) reduced the 40 items to 29 in their re-evaluation study, we decided to keep all the original questions, thus providing a bigger pool of questions to be analysed and used for model development.

The aim of this research is to test the hypothesis according to which the original 40-item SDLRSNE as an instrument to test self-directed learning readiness is suitable to be applied in virtual teams with the same subscales. Should the hypothesis be rejected, we are determined to develop our own SDLR construct.

Data Collection

The convenience sample has been collected through a questionnaire prepared in Google Sheets that it was circulated online in social media platforms, such as, several professional Facebook groups, LinkedIn, etc. (the questionnaire has further been shared by volunteers as well) Participation was encouraged as contribution to important research topic, it was voluntary and no reward was promised or given in return. Participants were asked to evaluate the items through a five-point Likert scale to the degree that individual items reflect their own characteristics. Score 1 indicated "strongly disagree", while score 5 indicated "strongly agree". Furthermore, several demographic and clarification questions were asked. Respondents could be categorised as working in virtual teams if more than 30 per cent of their time was spent working and cooperating virtually with their teammates.

Until the end of October 2020, 199 responses had been collected, and no further responses have been recorded afterwards, thus the data collection stopped. Out of the 199 responses 146 fulfilled all required conditions to be considered in the data analysis, i.e. fulfilled the condition that the participant works at least 30 per cent his/her time virtually when it comes to teamwork. From a demographical perspective, the total population of respondents and the chosen population had the following characteristics (Table 1):

	Gender	Age	Time spent in their current team	Number of direct team members	Percentage of virtual cooperation
Total Population (199)	Female: 112 Male: 86 Other/Prefer not to say: 2	18-24: 8 25-34: 111 35-44: 67 45-54: 10 55-64: 3	0-3 months: 19 4-7 months: 10 8-11 months: 19 1-3 years: 96 4-6 years: 38 7+ years: 27	2-4: 29 5-7: 68 8+: 102	0-10%: 10 11-20%: 16 21-30%: 27 31-40%: 19 41-50%: 13 51-60%: 29 61-70%: 23 71-80%: 18 81-90%: 17 91-100%: 27
Selected responses (146)	Female: 80 Male: 65 Other/Prefer not to say: 1	18-24: 6 25-34: 80 35-44: 52 45-54: 6 55-64: 2	0-3 months: 15 4-7 months: 7 8-11 months: 16 1-3 years: 66 4-6 years: 31 7+ years: 11	2-4: 20 5-7: 53 8+: 73	0-30%: 0 31-40%: 19 41-50%: 13 51-60%: 29 61-70%: 23 71-80%: 18 81-90%: 17 91-100%: 27

Table 1: Demographical data of the responses

Source: Own evaluation

Data Analysis

Data of the final sample of 146 working adults was subjected to methods of both exploratory and confirmatory factor analysis (EFA and CFA) as well as principal component analysis (PCA). Cronbach's Alpha was calculated for the original scale confirming its usability, however, the PCA, the EFA and the CFA did not confirm the original SDLRSNE factor structure (Fisher et al. 2001) on our sample, nor did the three one-factor congeneric

model version of the SDLRSNE (Fisher and King, 2010) result in a good fit. Subsequently, we subjected our sample of adults working in virtual teams to exploratory factor analysis with the aim of establishing a new factor structure for all or at least most of the original 40 items. CFA was also reiterated after having removed items with the lowest factor loading. Due to low correlations, however, no meaningful solution was found at this level of inquiry. Finally, confirmatory factor analysis was applied aiming at maintaining the original threedimensional factor structure but with a much-reduced item count. Content validity was sought through trying to select *best items* covering the core content of each dimension. Symmetry was considered to give equal weight to each subscale, and the three factors were analysed together – as opposed to the congeneric models (Fisher and King, 2010) – to legitimise the three subscales belonging together in one questionnaire despite the relatively low correlation among the dimensions. The data analysis process carried out in this paper, in practical terms, could be interpreted as the creation of a short form of the original SDLRSNE, because the reduced scale captures most of the original construct in terms of context. On the other hand, if we consider the context of virtual teams, the developed SDLR9 scale can be regarded as a new construct. All analyses were carried out with the statistical software R studio (RStudio Team, 2020).

Results

Given our data with adult working population from a cross-section of virtual teams we first aimed at testing the known SDLRSNE models in the literature. We approached the process of factor analysis as an experiment to confirm the established self-directed learning readiness theory but knowing that several modified scale versions had been already published and perhaps our analysis would lead to a new one. We first resorted to confirmatory factor analysis to test the 3-factor 40-item SDLRSNE developed by Fisher et al. (2001) and the 29-item three one factor congeneric model used some 10 years later by Fisher and King (2010) to confirm the basic factor structure of the self-directed learning readiness construct. Results on our data set of adult population working in virtual teams were not sufficient to confirm these models. CFA results for the 3-factor 40-item SDLRSNE showed a bad model fit (CFI = .552, RMSEA = .089, SRMR = .101). Alpha values for the three factors were .81, .76 and .78 respectively. CFA for the three one factor congeneric model fit for the first two factors while bad model fit for the third factor
bringing us, overall, to reject the model for virtual teams. (Factor 1: CFI = .809, RMSEA = .097, SRMR = .072; Factor 2: CFI = .842, RMSEA = .09, SRMR = .073; Factor 3: CFI = .589, RMSEA = .113, SRMR = .09). CFA results are summarized in Table 2.

Table 2. Confirmatory Factor Analysis of Self-directed Learning Models

Models	X2	df	р	CFI	TLI	RMSEA	SRMR
40 item SDLRSNE 3-factor	2666	780	.000	.552	.525	.089	.101
Three one factor congeneric							
Factor 1	544	78	.000	.809	.771	.097	.072
Factor 2	386	55	.000	.842	.803	.090	.073
Factor 3	593	120	.000	.589	.526	.113	.09
SDLR9 second order factor	352.28	36	.000	.097	.096	.049	.049
model	552.20						

Source: Own evaluation

Since the 3-factor 40-item SDLRSNE was originally arrived at through principal component analysis (Fisher et al., 2001), we computed a similar analysis on our sample with varimax rotation for 3 factors, however, the total variance explained by the model was only 30 per cent. We wanted to map the construct's factor structure further with exploratory methods, thus we resorted to exploratory factor analysis. We first computed a Bartletts test to make sure if items are correlated enough for an EFA ($\chi^2 = 2389$, p = .000). We then computed a Kaiser-Meyer-Olkin (KMO) Test for Sampling Adequacy to make sure that our dataset has enough subjects (Overall MSA = .78). Subsequently, we computed the EFA for the 3-factor model using oblique rotation (since factors within the same scale are expected

to correlate) and using the maximum likelihood factor math. Fit indices overall were insufficient to confirm the model (CFI = .703, RMSEA = .08) and the model overall accounted only for 30 per cent of the variance of the items, just like in the case of principal component analysis.

Because the 3-factor models known from the literature failed on our sample, we set out to estimate anew the number of factors for the EFA. To determine the number of factors we used the Kaiser criterion with eigenvalues above .7 as per the newer approach and eigenvalues above 1 as per the traditional approach. The number of factors suggested by the Kaiser criterion to set for the EFA was 6 and 5, respectively. We also computed a parallel analysis which compares data to randomised iterations to be able to select all factor with eigenvalues significantly above the randomised data. For this we used a scree plot (Figure 1) to determine the point of inflection.



Figure 1. Parallel analysis scree plot for EFA

Source: own evaluation

Results of the parallel analysis suggested we use 7 factors. Keeping in mind that parsimony dictates that simpler models with fewer factors are preferable over more complex

ones we computed EFA for all suggested factors with the results shown in Table 3. Since none of our new EFA models with all 40 items manifested a good model fit and explained sufficient cumulative variance, we tried to eliminate items with factor loadings lower than .3. After several iterations we abandoned the exploratory method and tried to do the same item selection based on factor loading results with confirmatory factor analysis for the 3-factor model. Fisher and King (2010) used a similar approach to arrive to the congeneric one factor models, the difference being that, as per our logic, we aimed at keeping the factor structure intact if we must eliminate items. The self-directed learning model was not possible to confirm with this approach either.

	Cumulative			
EFA Models	Variance	CFI	TLI	RMSEA
3 Factor model	.3	.703	.643	.08
5 Factor model	.37	.826	.761	.068
6 Factor model	.41	.87	.809	.063
7 Factor model	.43	.898	.839	.059

Table 3. Exploratory Factor Analysis of Self-directed Learning Models

Source: Own evaluation

Finally, we changed our experimental approach from trying to keep most of the original items to using only as many items as necessary and possibly keeping the original three factor model. Looking at the correlation table we identified possible items and considering the broadest possible content we determined best items for our subsequent confirmatory factor analysis. Knowing that three items per factor are minimum necessary, and keeping in mind model aesthetics, we aimed at a 9 item 3 factor model with three items loading on each factor. We also experimented with second order models driven by the idea that perhaps self-directed learning readiness is a separate latent variable in individuals that explains their levels of the first order latent factors. The model that we found, so to say, mirrors the traditional factor structure with three correlated factors. But more than this, for the first time,

self-directed learning readiness is shown to be a higher order latent construct that explains the first order factors. We think that our new model is significant because it confirms the legitimacy of the self-directed learning readiness measure for virtual teams of working adult population, while at the same time it represents evidence for the higher order self-directed learning readiness factor.

Discussion

As per the standard of several published studies (Newman, 2004; Bridges et al., 2007; Smedley, 2007), internal consistency is a decisive factor when evaluating the SDLRSNE. Based on the results, the Cronbach's Alpha scores support the applicability of the original 40 item SDLRSNE questionnaire in its original form on our sample of Hungarian adults working in virtual teams. On the other hand, deeper analysis about the factor structure of the construct revealed the insufficiency of the original 40-item scale (Fisher et al, 2001) on our sample, as several attempted methods of analysis (CFA, PCA with varimax rotation and EFA with oblique rotation) resulted in not supporting the applicability of the original SDLRSNE questionnaire for virtual teams. The revised scale of Fisher and King (2010) with 3 congeneric factors was also not possible to confirm on our sample. Thus, our hypothesis that the same 40-item SDLRSNE could be applied for virtual teams has to be questioned.

On the other hand, we did not only aim at confirming the SDLRSNE's applicability, but we were inspired by Fisher and King to revise and change the SDLRSNE scale and test whether by using different techniques and approaches we could find the best scale for the SDLR construct for virtual teams – more specifically for the working adult population of our sample. First, we tried to keep all items and recalibrate the factor structure, but EFA results failed to point to any alternative factor structure. We then tried to maintain the factor structure but eliminate weaker items. Larger models with many items did not fit as per our EFA and CFA results. The statistical reason behind these failed models is that there is low correlation between items in general on our sample. Finally, we found satisfactory models with low item numbers, thus we propose for adult working population in virtual teams the newly developed SDLR9 scale. The factor structure and the 9 items of the SDLR9 scale is the following (Table 4):

Table 4: Factor structure of the SDLR9

Self-Management	Desire for Learning	Self-Control		
I am organized	I enjoy learning new	I prefer to set my own goals		
I have good management	information	I prefer to set my own learning		
skills	I have a need to learn	goals		
I prioritize my work	I enjoy studying	I prefer to set my own criteria on		
		which to evaluate my performance		

Source: Own evaluation.

When this reduced item scale had been discovered during the analysis as a potential fit for the virtual teams, first the applicability of the items had to be analysed. Interestingly, when comparing the SDLR9 and the 40-item SDLRSNE, it seems that the SDLR9 managed not only to reduce the number of questions while keeping the same factor-structure but was able to mirror much of the essence of these subscales intact even after radically reduced item number. As noted in the theoretical analysis, self-management refers to the ability of learners to identify their needs, set their goals and allocate their time and energy to learning. The three items in this sub-scale reflect these requirements, as they cover management, prioritisation, and organisation skills of the individuals. Desire for learning focused on the strong motivation and preferences of learners to acquire knowledge – the reduced subscale in SDLR9 also focuses on the need and motivation for learning. When it comes to selfcontrol, the original items were revolving around the independency of the individual in their learning path which can also be seen in the 3-item subscale, as the wording emphasises the preference for individuality in their learning and goals.





Source: Own evaluation

The SDLR9 also has excellent psychometric properties as a unified model confirmed by CFA in contrast to the larger models proposed in the literature. Moreover, for the first time we can propose the SDLR construct as a higher order latent variable with the three original first order factors (Figure 2). A significant theoretical implication of the self-directed learning readiness construct as a higher order variable is that SLDR was never conceived as a unified personal resource that would work beyond the original first order factors of selfmanagement, desire for learning and self-control. The low correlations that we observed when considering all items explains not just why the larger models did not work specifically on our sample, but probably also why previous investigations found it hard to fit all three factors in one factor analysis (Fisher and King, 2010). By radically reducing the item number and taking advantage of the more correlated items one could argue that we arrived at a fundamentally different construct from the original SDLR as applied for nursing education. We would not necessarily contradict this observation primarily because the context of our research is outside of nursing and education. For working adults specifically from the world of virtual teams SDLR may mean somewhat different things, but whatever they are, they are important for the management literature. Thus, we are confident to propose the self-directed learning readiness construct for virtual teams and the related SDLR9 scale not necessarily as a shorter version of the 40-item SDLRNE, but as an individual instrument. Content analysis of the SDLR9, we believe, would show that the essence of the original SDLRNE is captured rather well, therefore given certain considerations such as time constraint or repetitive measurement, the SDLR9 could also be conceived of as a short form of the SDLRNE. The higher order factor structure evidenced in our model is an interesting development that would require follow up investigation on other samples, but it has the potential to elevate the research in self-directed learning readiness to a next level.

Conclusions

Virtual teams require different skills and capabilities from their leaders and members. This research aimed at looking at the level of the individual and analyse whether selfdirected learning readiness scales could be applied in virtual team settings. We collected a sample of 200 working adults from virtual teams in Hungary to test our hypothesis whether the SDLRSNE scale of Fisher et al. (2001), previously tested only in nursing education, could be adapted without changes to our sample. Based on the results of the statistical analysis, this hypothesis had to be rejected, which could be explained by applying the scale to a different type of learners (working adults, who are learning on the job), on a different social group (working adults) and from a different country (not just Hungary).

Although our statistical analysis did not allow us to confirm our original hypothesis, the research resulted in a new SDLR9 scale. This model follows the same 3-factor structure as the original 40-item SDLRSNE, the reduced number of items is still sufficient to reflect the requirements set forth in the academic literature for self-management, desire for learning and self-control. At the same time, as a novelty, it proposes self-directed learning readiness as a higher order latent variable, which was not present in the previous models.

There are, inevitably, limitations to this theoretical model which should be further tested to prove its suitability for virtual teams. The next step should be to validate the model, collect data from working adults in virtual teams and perform the same confirmatory factor analysis and statistical methods. If the model could be validated, this could provide a great tool for the leaders of virtual teams in the selection, learning and development process.

Summary and Future Research

Positive organizational psychology (POB) is at the intersection of organizational behavior and positive psychology (Luthans, 2002b), that is, it focuses on the individual level organizationally relevant measures and outcomes such as performance and satisfaction. performance. Psychological resources that belong to POB have been defined with the following criteria: "(a) grounded in theory and research; (b) valid measurement; (c) relatively unique to the field of organizational behavior; (d) state-like and hence open to development and change as opposed to a fixed trait; and (e) have a positive impact on workrelated individual-level performance and satisfaction." (Luthans et al., 2007, p. 542). In this dissertation the field of POB is expanded along these criteria based on observed gaps in the literature. For example, among the many POB interventions extant in the literature no specific research explored the process of peer teaching on psychological resources, the maxim "by teaching we learn" was not exploited in service to the development of employees' positivity. Similarly, in the extant literature, no PsyCap very short form scale is developed for researchers who are interested to efficiently assess only global PsyCap as opposed to PsyCap and all its dimensions in detail. The well-known Seven Habits book and training program by Stephen Covey (1989), on the other hand, was a genuinely unexplored territory for positive psychology and POB in terms of its psychological analysis and measurement.

The five research papers presented all have of course limitations as well as open new opportunities for future research. The first paper is probably the most straightforward building on a simple idea and a textbook execution of the psychometric analysis (see: Smith et al., 2000; and Credé et al., 2012), this is the PsyCap scale abridgement paper that resulted in the PCQ-5 very short form scale of the PCQ-24. Future research will have to validate independently the psychometric properties of the PCQ-5 beyond the four samples analyzed in the paper, but most opportunities will derive by simply applying the PCQ-5 to make research involving PsyCap more efficient.

The second paper is an intervention and as such it hinges more on the researchers' design decisions and even eventualities outside of the control of any parti involved. Our pretest, posttest, retest controlled trial in terms of content, measurement and analysis was strictly modelled based on the original PsyCap intervention studies (Luthans et al., 2010 and 2008). The intervention design – which was deliberately minimalist in order to test peer teaching

as an intervention method at its limits – leaves much room for refinement, alternatives and different applications. However, it was reasoned, that in order to substantiate the claim that the peer teaching about how to develop psychological resources impacts positively the same psychological resources which the teaching was about, only the minimum requirements of peer teaching are to be present. Such minimum requirements are a short information input, a one page reading in our case, and some time spent with the teaching activity, the minimum that can be considered meaningful, we suggested 5-10 minutes. Due to this minimalist approach, which nevertheless yielded significant and not trivial PsyCap increase, it is to be expected that more elaborated and longer peer teaching interventions are more effective. Also, important to mention, that we used PsyCap as our teaching material as well as the measured resource, because PsyCap is perhaps the most prominent resource in POB and due to its multidimensionality it covers a lot of ground. But the peer teaching method should be explored for other positive resources as well.

The two Seven Habits articles were an attempt to bring an established corporate practice within the realm of science. The Seven Habits at face value fit the field of positive organizational behavior, yet there was no systematic review and evaluation of Covey's material in terms of psychological theories. My efforts were focused on conceptualizing the Seven Habits in terms of self-determination theory (Deci and Ryan, 2000) and to develop a psychometrically sound 7Habits construct that is predicting existing positive constructs, yet it is distinct from them. The obvious limitation of the Seven Habits papers is that they build on a rather small sample (n = 53), therefore the viability of the 7Habits construct is to be demonstrated on larger samples. Also, the Seven Habits is a training program primarily that promises increased effectiveness through the continued practice of the habits. What remains to be researched is whether the Seven Habits training intervention results in increased effectiveness as linked to increased levels of the 7Habits construct. Similarly, the SDLR9 scale is also building on a sample size that doesn't allow for conclusive observation about its applicability across the board.

In summary, in my research I was exploring gaps in the literature and I tried to turn them into research opportunities to add to the body of knowledge of POB and hence as a result of this dissertation the literature about positive organizational behavior is enriched with a PCQ-5 scale, a new intervention method that avails of the benefits of peer teaching specifically worked out and tested to develop PsyCap, the Seven Habits corporate training is for the first time conceptualized scientifically within well-known motivational theory, namely selfdetermination theory, a 7Habits construct and measurement tool is developed and tested, its relationship is explored in relation to SDT, PsyCap, Thriving at work and the Big five personality traits, and the self-directed readiness construct is adopted for Hungarian adults working in virtual teams.

References

- Abdullah, M.M.B., Koren, S.F., Muniapan, B., Parasuraman, B. and Rathakrishnan B. (2008) Adult participation in self-directed learning programs. International Education Studies, Volume 1, Issue 3, pp. 66–72, https://doi.org/10.5539/ies.v1n3p66
- Annis, L.F. 1983. The process and effects of peer tutoring. Human Learning. 2: 39-47.
- Avey, J.B., Avolio, B.J., & Luthans, F. 2011. Experimentally analyzing the impact of leader positivity on follower positivity and performance. Leadership Quarterly, 21: 350–64
- Avey, J.B., Luthans, F., & Youssef-Morgan, C. (2010). The Additive Value of Positive Psychological Capital in Predicting Work Attitudes and Behaviors. Journal of Management, 36(2). doi: 10.1177/0149206308329961.
- Avey, J.B., Reichard, R.J., Luthans, F., & Mhatre, K.H. (2011b). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. Hum. Resour. Dev. Q. 22:127–52.
- Bakonyi, Z. and Kiss-Dobronyi, B. (2020): A COVID-19 járvány hatása a munkavégzésre Gyorsjelentés I. Accessed: 31st January 2021. http://tavmunkakutatas.hu/assets/files/gyorsjelentes_0420_v1.pdf
- Bargh, J.A. & Schul, Y. 1980. On the cognitive benefits of teaching. Journal of Educational Psychology, 72: 593–604.
- Barnard-Brak, L., Lan, W. Y. and Paton, V. O. (2010): Profiles in self-regulated learning in the online learning environment. The International Review of Research in Open and Distance Learning, Volume 11, Issue 1, pp. 61-80. https://doi.org/10.19173/irrodl.v11i1.769
- Barron, A.B., Hebets, E.A., Cleland, T.A., Fitzpatrik, C.L., Hauber, M.E and Stevens, J.R.
 (2015): Embracing multiple definitions of learning. Trends in Neurosciences, Volume 38, Issue 7, pp. 405-407. https://doi.org/10.1016/j.tins.2015.04.008
- Bell, B.S., and Kozlowski, S.W. (2002). A typology of virtual teams. Group and Organization Management, 27, 14-49. https://doi.org/10.1177/1059601102027001003

Benware, C.A. & Deci, E.L. 1984. Quality of learning with an active versus passive

motivation set. American Educational Research Journal, 21(4): 755-66.

- Berry, G.R. (2011). Enhancing effectiveness on virtual teams: understanding why traditional team skills are insufficient. Journal of Business Communication, Volume 48, Issue 2, April 2011 pp. 186-206. https://doi.org/10.1177/0021943610397270
- Biddle, B. J. 1979. Role Theory: Expectations, Identities, and Behaviors. New York: Academic.
- Bridges, P.H., Bierema, L.L. and Valentine, T. (2007): The propensity to adopt evidencebased practice among physical therapists. BMC Health Services Research, Volume 7, pp. 103–112. https://doi.org/10.1186/1472-6963-7-103
- Brislin, R. W., Lonner, W. J., & Thorndike, R. M. 1973. Cross-cultural Research Methods. New York: John Wiley.
- Candy, P. C. (1991): Self-Direction for Lifelong Learning: A Comprehensive Guide to Theory and Practice. Jossey-Bass Publishers, San Francisco, CA
- Cate, O.T. & Durning, S. 2007. Dimensions and psychology of peer teaching in medical education. Medical Teacher, 29(6): 546-552.
- Cheng, S.F., Kuo, C.L., Lin, K.C. and Lee-Hsieh, J. (2010): Development and preliminary testing of a self-rating instrument to measure self-directed learning ability of nursing students. International Journal of Nursing Studies, Volume 47, Issue 9, pp. 1152– 1158, https://doi.org/10.1016/j.ijnurstu.2010.02.002
- Chicchinelli, A, Veas, E, Pardo, A, Pammer-Schindler, V, Fessl, A. Barreiros, C. and Lindstadt, S. (2018): Finding traces of self-regulated learning in activity streams. Proceedings of the 8th International Conference on Learning Analytics and Knowledge, ACM (2018), pp. 191-200. https://doi.org/10.1145/3170358.3170381
- Cohen, S.G. and Bailey, D.R. (1997): What makes teams work: group effectiveness research from the shop floor to the executive suite? Journal of Management. 23(4), pp. 238–290. 1997
- Cortina, J.M. (1993). What is coefficient alpha? An examination of theory and applications. Journal of Applied Psychology, 78, 98–104.
- Covey, SR (1989). The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change. London: Simon and Schuster
- Credé, M., Harms P.D., Niehorster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five personality traits. J Pers Soc

Psychol. Apr;102(4):874-88. doi: 10.1037/a0027403. Epub 2012 Feb 20. PMID: 22352328.

- Csikszentmihalyi, Mihaly (1990). Flow: The Psychology of Optimal Experience. New York: Harper and Row. ISBN 0-06-092043-2
- 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: 348–370.
- Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001).
 Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country. Personality and Social Psychology Bulletin.
- Deci, Edward L. and Ryan, Richard M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. Psychological Inquiry, Vol. 11, No. 4, 227–268.
- Dello Russo, S. & Stoykova, P. 2015. Psychological Capital Intervention (PCI): a replication and extension. Human Resource Development Quarterly, 26: 329–47.
- Donaldson, Stewart & Ko, Ia. 2010. Positive organizational psychology, behavior, and scholarship: A review of the emerging literature and evidence base. Journal of Positive Psychology. 10.1080/17439761003790930.
- Durling, R. & Schick, C. 1976. Concept attainment by pairs and individuals as a function of vocalization. Journal of Educational Psychology, 68: 83–91.
- Fisher, M. and King, J. (2010): The self-directed learning readiness scale for nursing education revisited: A confirmatory factor analysis. Nurse Education Today, Volume 30, Issue 1, pp. 44–48, https://doi.org/10.1016/j.nedt.2009.05.020
- Fisher, M., King, J. and Tague, G. (2001): The development of a self-directed learning readiness scale for nursing education. Nurse Education Today, Volume 21, Issue 7, pp. 516–525, https://doi.org/10.1054/nedt.2001.0589
- Garrison, D.R. (1997): Self-directed learning: toward a comprehensive model. Adult Education Quarterly, Volume 48, Issue 1, pp. 18–33, https://doi.org/10.1177/074171369704800103
- Gartner (2020): Gartner HR Survey Reveals 88% of Organizations Have Encouraged or Required Employees to Work From Home Due to Coronavirus, accessed: 31st January 2021. https://www.gartner.com/en/newsroom/press-releases/2020-03-19-

gartner-hr-survey-reveals-88--of-organizations-have-e

- Gartner, A., Kohler, M. & Riessmann, F. 1971. Children Teach Children: Learning by Teaching. New York: Harper and Row.
- Greg, R. (1993): Student perceptions about self-directed learning in a professional course implementing problem-based learning. Studies in Higher Education, Volume 18, Issue 1, pp. 53–63, https://doi.org/10.1080/03075079312331382458
- Guglielmino, L.M. (1977): Development of the Self-Directed Learning Readiness Scale. Unpublished Doctoral Dissertation, University of Georgia. Dissertation Abstracts International, Volume 38, Issue 11a, pp. 6467.
- Heitlerné Lehoczky, M. 2017. A pszichológiai tőke differenciáló szerepe a munkaerőpiacon. Válogatott tanulmányok a társadalomtudományok köréből, ISBN 978-80-89691-46-3. DOI: 10.18427/iri-2017-0108
- Hong, J-C., Lee, Y-F. and Ye J-H. (2021): Procrastination predicts online self-regulated learning and online learning ineffectiveness during the coronavirus lockdown.
 Personality and Individual Differences, Volume 174, 110673, https://doi.org/10.1016/j.paid.2021.110673
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1–55.
- Ilardi, B. C., Leone, D., Kasser, R., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. Journal of Applied Social Psychology, 23, 1789-1805.
- Jackson, B (1999). The goose that laid the golden egg? A rhetorical critique of Stephen Covey and the Effectiveness Movement. Journal of Management Studies 36(3): 353– 378.
- Judge, T. A., Locke, E. A., Durham, C. C., & Kluger, A. N. 1998. Dispositional effects on job and life satisfaction: The role of core evaluations. Journal of Applied Psychology, 83(1): 17-34.
- Kasser, T., Davey, J., & Ryan, R. M. (1992). Motivation, dependability, and employeesupervisor discrepancies in psychiatric vocational rehabilitation settings. Rehabilitation Psychology, 37, 175-187.

Katz, D., & Kahn, R. L. 1966. The social psychology of organizations. New York: Wiley.

- Knowles, M. (1975): Self-directed Learning: A Guide for Teachers and Learners. Association Press, New York.
- Kupa, K. (2020a): Challenges and Benefits of Virtual Teams: A Leadership Perspective, In:
 58th International Scientific Conference on Economic and Social Development, Book of Proceedings, Budapest, pp. 193–202.
- Kupa, K. (2020b): Self-Directed Learning Readiness in Virtual Teams, Tér Gazdaság-Ember, Volume 8, Issue 4, pp. 77-89. https://tge.sze.hu/images/dokumentumok/K%C3%B6tetek%20%C3%B6sszes%20c ikkel/2020.%20VIII.%20%C3%A9vfolyam%204.%20sz%C3%A1m%20(angol)_ci kkek/TGE 2020 8 evfolyam 4 szam Kupa.pdf
- Liden, R. C., Wayne, S. J., Meuser, J. D., Hu, J., Wu, J., & Liao, C. (2015). Servant leadership: Validation of a short form of the SL-28. The Leadership Quarterly, 26(2), 254-269, ISSN 1048-9843, https://doi.org/10.1016/j.leaqua.2014.12.002.
- Lipnack, J. and Stamps, J. (2000). Virtual Teams: People Working Across Boundaries with Technology (Second edition), John Wiley & Sons, New York
- Lorenz, T., Beer C., Pütz J., & Heinitz K. (2016). Measuring Psychological Capital: Construction and Validation of the Compound PsyCap Scale (CPC-12). PLoS ONE 11(4): e0152892. https://doi.org/10.1371/journal.pone.0152892
- Lupsa, Daria & Virga, Delia & Maricutoiu, Laurentiu & Rusu, Andrei. 2019. Increasing Psychological Capital: A pre-registered meta-analysis of controlled interventions. Applied Psychology. 10.1111/apps.12219.
- Luthans, F. (2002a). The need for and meaning of positive organizational behavior. Journal of Organizational Behavior, 23, 695–706.
- Luthans, F. (2002b). Positive Organizational Behavior: Developing and managing psychological strengths. Academy of Management Executive, 16, 57–72.
- Luthans, F., & Youssef-Morgan, C. M. 2017. Psychological capital: An evidence-based positive approach. Annual Review of Organizational Psychology and Organizational Behavior, 4: 339-366.
- Luthans, F., Avey, J. B., & Patera, J. L. 2008. Experimental analysis of a Web-based intervention to develop positive psychological capital. Academy of Management Learning and Education, 7: 209–221.

- 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.
- Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. J. 2006. PsyCap development: Toward a micro-intervention. Journal of Organizational Behavior, 27: 387–393.
- 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, 541–572. doi:10.1111/j.1744-6570.2007.00083.x
- Luthans, F., Luthans, K., & Luthans, B. 2004. Positive psychological capital: Going beyond human and social capital. Business Horizons, 47: 45–50.
- Maslow, MH (1954). Motivation and Personality (1st edition: 1954, 2nd edition: 1970, 3rd edition 1987)
- Mccabe, D (2011). Opening Pandora's box: The unintended consequences of Stephen Covey's effectiveness movement. Management Learning 42(2):183-197
- Mead, G. H. 1934. Mind, self, and society: From the standpoint of a social behaviorist. Chicago, IL: University of Chicago Press.
- Millar, M. (2013). "Using the 7 Habits programme to develop effective leadership". NURSING MANAGEMENT, October 2013 | Volume 20 | Number 6
- Mills, Maura & Fleck, Christina & Kozikowski, Andrzej. 2013. Positive psychology at work: A conceptual review, state-of-practice assessment, and a look ahead. The Journal of Positive Psychology, 8: 153-164. 10.1080/17439760.2013.776622.
- Newman, M. (2004): Problem based learning: an exploration of the method and evaluation of its effectiveness in a continuing nursing education programme. Project on the Effectiveness of Problem Based Learning (PEPBL) Research Report, Middlesex University, Middlesex. Accessed: 20th February 2021. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.118.3649&rep=rep1&ty pe=pdf
- Pardo, A, Han, F. and Ellis, R.A. (2016): Combining university student self-regulated learning indicators and engagement with online learning events to predict academic performance. IEEE Transactions on Learning Technologies, Volume 10, Issue 1, pp. 82-92. https://doi.org/10.1109/TLT.2016.2639508

- Porath, C., Spreitzer, G. M., Gibson, C., & Garnett, F. G. (2012). Thriving at Work: Toward its measurement, construct validation, and theoretical refinement. Journal of Organizational Behavior, 33(2), 250–275.
- R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.Rproject.org/.
- Rammstedt, B. and John, O. P. (2007). Measuring personality in one minute or less: A 10item short version of the Big Five Inventory in English and German. Journal of Research in Personality, 41 (2007) 203–212
- Revelle W. (2019). psych: Procedures for Psychological, Psychometric, and Personality Research. Northwestern University, Evanston, Illinois. R package version 1.9.12, https://CRAN.R-project.org/package=psych.
- Riessman, F. 1965. The "Helper-Therapy" Principle. Social Work, 2: 27-32.
- Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software, 48(2), 1–36. <u>https://www.jstatsoft.org/v48/i02/</u>.
- RStudio Team (2020). RStudio: Integrated Development for R. RStudio, PBC, Boston, MA URL http://www.rstudio.com/.
- Ryff, C. D., Keyes, C. L. M. (1995). The structure of psychological well-being revisited. Journal of Personality and Social Psychology, 69, 4, 719-727.
- Seligman, M. E. P., & Csikszentmihalyi, M. 2000. Positive Psychology: An Introduction. American Psychologist, 55: 5–14.
- Smedley, A., 2007. The self-directed learning readiness of first year bachelor of nursing students. Journal of Research in Nursing, Volume 12, Issue 4, pp. 373–385. https://doi.org/10.1177/1744987107077532
- Smith, G.T., McCarthy, D.M., & Anderson, K.R. (2000). On the sins of short-form development. Psychological Assessment, 12, 102–111.
- Snyder, C.R., Irving, L., & Anderson, J. (1991). Hope and health: Measuring the will and the ways. In Snyder CR, Forsyth DR (Eds.), Handbook of social and clinical psychology (pp. 285–305). Elmsford, NY: Pergamon.
- Society for Industrial and Organizational Psychology (SIOP) (2003). Principles for the validation and use of personnel selection procedures. Bowling Green, OH: SIOP.

Spector, P. E., Bauer, J. A., & Fox, S. (2010). Measurement artifacts in the assessment of

counterproductive work behavior and organizational citizenship behavior: Do we know what we think we know? Journal of Applied Psychology, 95(4), 781-790. doi: <u>http://dx.doi.org/10.1037/a0019477</u>

- Stajkovic, A. D., & Luthans, F. (1998b). Social cognitive theory and self-self efficacy: Going beyond traditional motivational and behavioral approaches. Organizational Dynamics, 26, 62–74.
- Stanton, J., Sinar, E., Balzer, W. and Smith, P. (2002). Issues and strategies for reducing the length of self-report scales. Personnel Psychology. 55. 167-194. 10.1111/j.1744-6570.2002.tb00108.x.
- Starck, P. (1995). "Nurse-Managed Clinics: A Blueprint for Success Using the Covey Framework". Journal of Professional Nursing, Vol 11, No 2 (March-April), 1995: pp 71-77
- Szerdahelyi, M. and Komlósi, I. (2020). The positive psychological basis, measurement and outcomes of covey's 7habits. Economic and Social Development: 52nd International Scientific Conference on Economic and Social Development. ISSN 1849-7535.
- Van Dyne, L., & LePine, J. A. (1998). Helping and voice extrarole behavior: Evidence of construct and predictive validity. Academy of Management Journal, 41, 108-119.
- Weick, K. E. 1979. The social psychology of organizing. New York, NY: Random House.
- Welbourne, T., Johnson, D., & Erez, A. (1998). The Role-Based Performance Scale: Validity Analysis of a Theory-Based Measure. CAHRS Working Paper Series. 41. 10.2307/256941.
- Whitman, N.A. 1988. Peer teaching: To Teach Is To Learn Twice (ASHE-ERIC Higher Education Report). Washington DC: ERIC Clearinghouse on Higher Education.
- Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. Journal of Management, 17(3), 601–617.
- Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. Journal of Management, 17(3), 601–617.
- Williamson, S.N. (2007): Development of a self-rating scale of self-directed learning. Nurse Researcher, Volume 14, Issue 2, pp. 66–83 http://doi.org/10.7748/nr2007.01.14.2.66.c6022

- Zakaria, N.-Amelinckx, A.-Wilemon, D. (2004): Working together apart? Building a knowledge-sharing culture for global virtual teams. Creativity and Innovation Management, Volume 13, Issue 1, pp. 15–29, https://doi.org/10.1111/j.1467-8691.2004.00290.x
- Zhang, X., Li, Y. L., Ma, S., Hu, J., & Jiang, L. 2014. A structured reading materials-based intervention program to develop the PsyCap of Chinese employees. Social Behavior and Personality: An International Journal, 42(3): 503-515.