Impact of Positive Psychological Capital on employee work stress over time

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Abstract

This research examined the relationship between the four subscales of between Psychological Capital (PsyCap) and work stress. Furthermore, this research evaluated the impact of a PsyCap training on decreasing work stress. Four PsyCap constructs were distinguished: optimism, hope, resilience, and self-efficacy. Three studies found a negative relationship between PsyCap and work stress: the higher the individuals' level of PsyCap, the lower work stress. Study 1 (N = 90 employees) was a cross sectional study with a digital survey, which showed that PsyCap explains 40% of the variance in work stress. Optimism and hope account for unique variance when predicting work and study stress. Using a Solomon four group design, Study 2 (*N* = 57 students) revealed that students' level of resilience and self-efficacy session increased after the training, on the short as well on the long term. Study 3 (*N* = 19 employees) with a one-group pretest posttest design, showed an increase in employees' level of optimism, hope, and resilience after the training. Finally, Study 2 showed that the PsyCap training decreased study stress shortly after the last training. In addition, Study 3 showed that the affective component of work stress decreased the most after the PsyCap training. The results of this research revealed that training the individuals' level of PsyCap reduces some or more components of work or study stress. This suggests that implementing PsyCap training sessions will have a positive effect on psychological wellbeing of employees and students.

Introduction

Previous research reveals the serious consequences of work stress on health: too much work stress is not healthy (e.g. Kivimäki et al., 2002; Chandola et al., 2008). More than 30 percent of the work related absence in the Netherlands is caused by workload or work stress (TNO, 2013). Work stress has social, mental and physical consequences for the employee, and thus also financial consequences for the company. For example, high levels of work stress result in non-productive employees, costs of absence of the employees, and so on (TNO, 2013). In Europe, the total costs related to stress and mental disorders is estimated around 240 billion euro each year. The same study showed that 40% of the Dutch employees report that they need measures to reduce workload and work stress (TNO, 2013). The World Health Organization states that stress is the health epidemic of the 21st century (Health and Safety Executive, 2013). Although considerable theoretical and practical attention has been devoted to stress reduction over the past years, new perspectives and more practical research to protect against the consequences of work stress is needed.

There are several perspectives on stress and reacting on situations with stress. Janke and Erdmann (1985, as cited in Harzer & Ruch, 2015) provided a model of coping with stress. Twenty different coping modes are distinguished, which in turn can be subsumed into two broad categories, namely positive and negative coping strategies. Negative coping strategies entail coping behaviors that do not reduce stress but instead augment it over time in an attempt to escape stressful situations. Positive coping strategies reduce stress by perceiving demanding situations as personal challenges. Individuals with positive coping strategies are not reactive but proactive, as they take constructive actions and see opportunities. Research indicates that positive coping strategies have a positive correlation with *Psychological Capital*, a construct of the positive psychology (Li & Xiangpei, 2011). During the last decades a flourishing direction of psychology is positive psychology, which is the study of positive

emotion, positive character, and positive institutions (Seligman, Steen, Park & Peterson, 2005). Literature states that some individuals are not able to handle the psychological impact of stressors, which will lead to physical and psychological health symptoms, while other individuals do have the capacity to rebound and to experience little or no change in their functioning (Youssef & Luthans, 2007). A better understanding of work stress reduction can be achieved by examining the link between personality characteristics and stress. Research showed that there is a positive relation between the capacity to deal with stress, and work related positive characteristics (optimism, hope, resilience and self-efficacy) called Psychological Capital (PsyCap). These characteristics are measurable and open to development and improvement, which make PsyCap ideal for use in training programs (Youssef & Luthans, 2007). Research showed a negative relation between PsyCap and work stress, yet the direction of this relationship is not well understood. We propose that the present research about stress and the four PsyCap-constructs will give better understanding and practical implications of how to manage employees' stress. PsyCap may turn out to be a critical resource to cope with stressful events.

The present research consists of three studies which examines a model that describes the relation between PsyCap and work stress. Moreover, we will also conduct an evaluation of a training which reduces work stress by enhancing PsyCap to test whether this training is an effective method for stress reduction and coping with stress. First, we will discuss the theoretical background of work stress, followed by the constructs of PsyCap, and an explanation of the setup of the PsyCap training. After presenting the methodology and testing the hypotheses, we conclude with some practical implications of the findings to help build employees' PsyCap.

Work stress

The number of factors contributing to workplace stress have increased the last years. Heavier workloads and increased travel for business, but also technological change and managerial bullying affect stress levels. Additionally, heightened levels of job insecurity, more competition at the workplace and downsizing, make today's workplace even more stress-laden then a couple of years ago. A study by the American Psychological Association (APA) noted that 50% of the Americans say their stress levels have significantly increased the past five years, and work is the biggest stressor for 74% of the respondents (Bethune & Panlener, 2007).

The classic definition of stress is described by Lazarus (1966, as cited in Avey, Luthans & Jensen, 2009) as it "occurs when an individual perceives that the demands of an external situation are beyond his or her perceived ability to cope with them". Although stress can result in negative outcomes, it is important to note that stress can also have positive outcomes. For example, Le Fevre, Matheny and Kolt (2003) showed that stress increased creativity and another study showed enhanced performance (Marino, 1997, as cited in Avey, Luthans & Jensen, 2009)**.** Despite the possible benefits of stress, it can also lead to a variety of negative reactions at physiological, psychological or behavioral level. Long-term stress can result in health problems, increased accidents, burnout, and even death.

In addition to the consequences for the employees themselves, workplace stress also has impact on companies because of the apparent connections between perceived stress, employee performance, and undesirable organizational outcomes as job dissatisfaction and burnout. Too often, this results in voluntary turnover. Bethune and Panlener (2007) found that 52% of the employees had searched for a new job or left a job because of their high levels of perceived workplace stress. The consequences of work stress depend on the coping mechanism of the individual. Some individuals will experience undesirable physical and psychological health symptoms, while others have the capacity to rebound and experience

almost no change in their functioning (Youssef & Luthans, 2007). We propose that insights obtained by the present research will provide a better understanding of, as well as practical guidelines for reducing, the workplace stress in organizations.

Psychological Capital

According to Luthans, Youssef and Avolio (2007, p. 3) Psychological Capital has the following definition:

"an individual's positive psychological state of development and is characterized by: 1) having confidence (*self-efficacy*) to take on and put in the necessary effort to succeed at challenging tasks; 2) making a positive attribution (*optimism*) about succeeding now and in the future; 3) persevering toward goals and, when necessary, redirecting paths to goals (*hope*) in order to succeed; and 4) when beset by problems and adversity, sustaining and bouncing back and even beyond (*resilience*) to attain success."

Luthans, Avolio and Youssef (2007) believe selecting the right people for the right job is necessary for effective human resource management, but that's not enough. They are convinced that human potential is far more elastic than previously assumed. The proposed PsyCap constructs are positive psychological capacities which are state-like and malleable. Thus, those positive state-like capacities are open to development and improvement. This makes PsyCap ideal for use in training programs, on the job activities and micro-interventions (Luthans, Avey, Avolio, Norman & Combs, 2006).

In the past few years, the interest in PsyCap has been growing. A lot of research shows the positive relationships between PsyCap and other desirable variables. For example, the results of Culbertson, Mills and Fullagar (2010) showed the relationship between PsyCap and employees' well-being. The results from panel data and daily surveys showed that daily work well-being was significantly associated with daily positive mood and daily life satisfaction.

The variance in work well-being was predicted by employee's PsyCap. Furthermore, a meta-analysis of the impact of PsyCap on employee attitudes, behaviors and performance showed that PsyCap is strongly related to desirable employee attitudes. These include job satisfaction, organizational commitment and again psychological well-being at work (Avey, Reichard, Luthans & Mhatre, 2011). The same research showed that there is a significant relationship between employees' PsyCap and their performance. But PsyCap research also focused on the negative relationships between PsyCap and undesirable attitudes and behaviors. For example, Liu, Chang, Wang and Wang (2012) conducted a cross-sectional survey among female physicians which measured depressive symptoms, work stress and PsyCap to test whether PsyCap has a mediating role between work stress and depressive symptoms. The results showed a mediation effect of PsyCap between work stress and depressive symptoms. Based on this Liu et al. (2012) concluded that PsyCap development should be included in prevention and treatment strategies for depression. So far, the positive effects of enhancing PsyCap by a training have not been established. Additionally, it is valuable to know more about the relationship between PsyCap and coping with stress. This requests for a research which examines the effect of a PsyCap training on stress reduction.

Luthans, Avolio and Youssef (2007) define PsyCap in terms of four positive state-like capacities: optimism, hope, resilience and self-efficacy. Each capacity will be discussed in the following section.

Optimism

Optimism is a positive explanatory style regarding self-attributions for success (Liu et al., 2012). A pessimistic explanatory style interprets positive events with external, temporary and global event attributes. Besides that, pessimists see negative events in terms of personal and permanent causes. Someone with an optimistic explanatory style attributes positive events to personal, permanent and specific causes, and negative events in terms of external and

temporary causes. For example, when employees have to deal with a lot of stressors in their workplace, they should distinguish facts from perception and learn from the misfortunes that were beyond their control. Optimism could be developed through mercy for the past, appreciating the present and seeking opportunities for the future (Luthans, Avolio & Youssef, 2007). Later on, we will discuss how to develop optimism more extensively.

The construct optimism is based on learned optimism (Seligman, Steen, Park & Peterson, 2005). Individuals who never become helpless tend to have an optimistic explanatory style. Being optimistic is associated with a wide array of beneficial consequences. For example, optimists may be more successful than average. Seligman and Schulman (1986) did research in an insurance company and revealed that more optimistic salesmen sold more life insurances than less optimistic ones. Additionally, the optimistic salesmen were half as likely to quit their job. Furthermore, people who are optimistic are more likely to cope with stress. Aspinwall and Taylor (1992) confirmed these findings when studying students at the start of a college year, which is a stressful time for new students. The researchers concluded that higher levels of optimism at the start of the year predicted less distress at the end of the semester. The study of Aspinwall and Taylor (1992) did not examine whether enhancing optimism by using a training would be effective to reduce stress.

In the present research we will not only test if high optimism is correlated with less work stress, but also examine whether a PsyCap training increases individuals' level of optimism.

Hope

The PsyCap construct hope is defined as a positive motivational state directing perseverance towards desired goals and pathways for success (Liu et al., 2012). Hope is positively related to performance, job satisfaction, work happiness, and organizational commitment (Luthans & Jensen, 2002). Even though there is evidence of those positive

benefits of hope, up to now there is hardly any research about the relationship between hope and work stress. But the same definition of hope is used in other fields, like clinical psychology and athletics. Research in these fields suggests that hope provides individuals a positive resource for stressful work situations. High-hope athletes as compared to low-hope athletes are more successful, especially during stress-filled competitions. High-hope thinking helps athletes in finding the best routes to their particular sport goal, and motivating the athlete to use those routes. Curry et al. (1997) let professional athletes complete the Hope Scale at the beginning of their season. Their coaches rated the natural abilities of the athletes. At the end of the semester, the high-hope athletes performed significantly better than the low-hope athletes. Snyder, Irving and Anderson (1991) showed that hope has a significant negative correlation with anxiety. Training interventions have proven successful in supporting and building individuals' hope (Snyder, 200). Hope could be developed in a training by goal setting, participation and contingency planning for alternative pathways to attain goals (Luthans, Avolio & Youssef, 2007). Later on, we will discuss more extensively how hope could be developed in a training.

Because of the lack of research about the relationship between hope and work stress, the present research examines whether a high level of hope is correlated with less work stress. We will also examine whether a PsyCap training will increase individuals' level of hope.

Resilience

The construct resilience is defined as the positive psychological capacity to bounce back from and beyond failure and adversity to achieve success (Liu et al., 2012). Resilient individuals have a positive outlook, view change as a challenge, are action-oriented, and are able to express needs and engage support of others (Spangler, Koesten, Fox & Radel, 2012). Resilience could be developed through asset-focused strategies such as enhancing employ-ability, and risk-focused strategies to influence the interpretation of adverse events (Luthans,

Avolio & Youssef, 2007). Later on, we will discuss more extensively how to enhance the PsyCap-construct resilience through a training.

Steensma, den Heijer and Stallen (2007) evaluated the effects of a resilience training on employees who are working or had worked in the (health) service sector. These employees were all suffering from protracted illness due to stress or burnout. After the resilience training sessions, the participants demonstrated far less passivity and avoidance, and showed more active coping, social support seeking, and more comforting thoughts. Steensma et al. (2007) concluded that the resilience training is effective to partially or fully cure burnout. The resilience training used by Steensma and colleagues is different from the training we will use in the present research, but it does suggest that enhancing resilience leads to more coping with stress and reduced stress symptoms.

Research by Tugade and Fredrickson (2004) confirmed the results mentioned above. They concluded that resilient individuals are better in dealing with stressors in a constantly changing workplace environment, as they are open to new experiences when they are flexible to changing demands. Furthermore, resilient people show more emotional stability when faced with adversity.

In the present research we will not only test if a high level of resilience is correlated with less work stress, but also examine the influence of a PsyCap training on the individuals' level of resilience.

Self-efficacy

Based on Bandura's (1997) social cognitive theory self-efficacy can be defined as the positive belief about one's abilities to succeed at challenging tasks within a given context (Liu et al., 2012). People with high PsyCap efficacy do not wait for challenging goals, but create their own challenges with higher self-set goals. They are seeking and choosing difficult tasks

by themselves. Self-efficacy also helps to persevere when there are obstacles that may otherwise lead to giving up. Efficacy can be developed through the opportunities to experience success, vicarious learning, positive feedback, and psychological and physiological arousal (Luthans, Avolio & Youssef, 2007). Later on, we will discuss how self-efficacy could be enhanced with a training.

The study of Klassen and Durksen (2014) showed the relation between self-efficacy and stress. They examined the development of self-efficacy and work stress of pre-service teachers during a teacher practicum. This period is rated by pre-service teachers as the most stressful experience during their professional preparation. The variables self-efficacy and stress were measured across eight time periods. Klassen and Durksen (2014) revealed a pattern of significantly increasing self-efficacy and significantly decreasing stress. Thus, someone with a high self-efficacy will experience less stress than someone with low self-efficacy. This is in line with the research of Bandura (2008) which showed that human stress is governed by beliefs about coping self-efficacy. This study improved the participants' self-efficacy in course of time by getting more experience. However, it is not proven that enhancing self-efficacy by participating in a PsyCap training would be effective to reduce stress too.

In the present research we will not only examine whether a higher level of self-efficacy is related to less stress, but also examine the influence of a PsyCap training on the level of self-efficacy.

It has been argued that PsyCap is a higher-order construct that is composed of the shared variance of optimism, resilience, self-efficacy and hope (Luthans, Youssef & Avolio, 2007). This means that PsyCap is not made of the underlying constructs, but taken together they form an entity that is more than the sum of its parts.

The four capacities, optimism, hope, resilience and self-efficacy, defined as PsyCap by Luthans, Avolio and Youssef (2007) are not meant to represent an exhaustive list. Other psychological capacities could be considered for inclusion in PsyCap as well. For a psychological strength or capacity to be included in PsyCap, it must be measurable, state-like or developmental, and related to work performance outcomes (Luthans, Avolio & Youssef, 2007). The positive psychology literature presents a lot of positive constructs which are highly promising in terms of their theoretical background and the applicability to the workplace (e.g., Youssef & Luthans, 2007; Siu, 2013). For example, gratitude, forgiveness, emotional intelligence, authenticity and courage are positive capacities which still seem worth of consideration, but do not yet meet all established PsyCap criteria. Although there are some interesting potential PsyCap constructs, the present research focuses only on the four PsyCap constructs as defined by Luthans, Avolio and Youssef (2007): optimism, hope, resilience and self-efficacy. The effects between enhancing these four constructs by a training and work stress need to be established. If there is a significant influence between training these four constructs and the reduction of work stress, other potential PsyCap constructs could be examined in future research.

Training

The present research consists of three studies. Two of these evaluate the impact of a PsyCap training. In the past, Luthans, Avolio and Youssef (2007) conducted PsyCap micro-interventions, a highly focused and very short training session, showing a significant increase in PsyCap in the experimental group compared to the control group. The participants' level of PsyCap in those studies increased on average about 2 percent. This increase may not seem very large, but utility analyses demonstrate that this could have desirable results. Using formulas and data of top mid-sized firms (revenue of 1.5 billion euro) the 2 percent increase in PsyCap of employees could potentially increase revenues by over 9 million euro per year.

This calculation is based on many assumptions, but the costs of a PsyCap training are relatively small compared to the potential increase of revenues. When the impact of the PsyCap training in this research is sustainable, this could have positive economic results for companies (Luthans et al., 2006).

The training sessions in the present research are based on the micro-interventions of Luthans, Avolio and Youssef (2007). Four workshops will be given, each workshop will take 2 – 2,5 hours and one PsyCap construct will be treated per workshop. The training is interactive and supported by short theoretical background. The participants apply the new techniques on self-contributed daily examples. The focus of each training session will be discussed shortly here.

Optimism

This training is about enhancing the perceived influence and control over positive outcomes, both in the past and the future. During the session the participants' view may shift from the feeling that they have less influence in reaching positive outcomes, to more perseverance when they experience obstacles. After the training the participants may see more ways of solving problems and may see what their own influence is on the outcomes they want to achieve.

Hope

To enhance participants' level of hope the participants will generate work-related goals that are valuable and challenging to them. These goals should contain a clear beginning and end point. Then the participants will identify obstacles that they could encounter when trying to reach their goals. So, they will practice generating multiple pathways to the goals they have set up. When the participants determined their own goals and pathways, they will evaluate the

goals and pathways of the other participants. The focus of this exercise is on making plans to overcome obstacles.

Resilience

Resilience will be increased by building awareness of talents, skills and social networks. Furthermore, the participants will identify realistic risks when reaching their goals, and think about how to handle those risks and obstacles. This will increase awareness of initial thoughts and feelings when faced with adversity. Additionally, the participants may learn to focus on resilient thoughts based on their own resources and be less worried about obstacles.

Self-efficacy

In this training session the participants will learn from positive learning experiences, feedback of others and modeling. In one exercise, the participants will remember a successful project in which they had an important role. They may discover which capacities and skills were meaningful and how others complete such projects. The participants may develop awareness that their meaningful capacities and skills are also useful in completing challenging projects successful in the future.

Overview of studies

Based on the discussed literature, we conclude that more insight in the relationship of PsyCap and work stress is very important to examine whether PsyCap is a critical resource to cope with stressful events. This research consists of three studies. The first study is a cross sectional study with employees who work more than 24 hours a week, to investigate whether PsyCap is negatively related to work stress. The second study is an experimental study with students who participate in the PsyCap training. The study investigates whether the

participants' level of PsyCap significantly increases compared to a control group, and if this training reduces their study stress. Lastly, in the third study employees of a small-sized company participate in the PsyCap training. This study examines if the PsyCap training increases the employees' level of PsyCap and reduces their work stress.

Study 1

A meta-analysis of the impact of PsyCap on employee attitudes, behaviors and performance showed that PsyCap is strongly related to desirable employee attitudes. Desirable employee attitudes include job satisfaction, organizational commitment and well-being at work (Avey et al., 2011). Moreover, the same research showed negative relationships of PsyCap and undesirable attitudes and behaviors. One of these undesirable attitudes is work stress. So, a high level of PsyCap predicts less work stress. The present research will search for support of the previous results. The study uses a questionnaire to examine whether employees' level of PsyCap is negatively related to their work stress. Based on the discussed literature we expect the following hypotheses:

Hypothesis 1: Employees' level of PsyCap is negatively related to their work stress.

H1a: Employees' level of optimism is negatively related to their work stress.

H1b: Employees' level of hope is negatively related to their work stress.

H1c: Employees' level of resilience is negatively related to their work stress.

H1d: Employees' level of self-efficacy is negatively related to their work stress.

Also, the discussed literature suggest the following about employees' PsyCap and explaining unique variance in work stress.

Hypothesis 2: Employees' PsyCap explains unique variance in employees' work stress.

H2a: Employees' optimism explains unique variance in employees' work stress.

H2b: Employees' hope explains unique variance in employees' work stress.

H2c: Employees' resilience explains unique variance in employees' work stress.

H2d: Employees' self-efficacy explains unique variance in employees' work stress.

Method

Participants and design

The respondents were 90 employees (35 male, 55 female; mean age: 38.9) who work more than 24 hours a week in different Dutch organizations. The respondents work an average of 34.8 hours a week (*SD* = 9.02). The questionnaire is distributed via social media and e-mail to the private social networks of the researchers. The respondents participated voluntarily, no rewards were given. The present study was a cross sectional study. The data was collected via an online questionnaire.

Procedure

This study consisted of an anonymous questionnaire which was presented as a research about the respondents' work, and a construct of positive psychology, i.e., Psychological Capital. Filling in the questionnaire took about 5-10 minutes.

Material and measurement instruments

The data of this research are collected via a questionnaire, which measured the variables PsyCap, hope, optimism, resilience, self-efficacy and work stress.

PsyCap. The PsyCap variable is a mean score for 21 items of the Psychological Capital Questionnaire (PCQ) of Luthans, Avolio, Avey and Norman (2007). So this is a total mean score for the four following PsyCap constructs. The resulting scores represent an individual's level of PsyCap on that moment. The respondents used a 5 point Likert scale to indicate the level of agreement or disagreement with each PsyCap statement (1 = "strongly disagree" and 5 = "strongly agree"). Each of the four subscales of PsyCap was drawn from established scales that had been published previously and had been tested and used in recent workplace

studies (Avey, Youssef & Avolio, 2007). The Cronbach's alphas which are reported in their study were as follows: optimism .78; hope .87; resilience .72; and self-efficacy .87.

Optimism. The variable optimism is the mean of five items of the PCQ about optimism. An example of an optimism item of the PCQ is "I always look on the bright side of things regarding my job". The items of optimism will be answered by the employees on a 5 point Likert scale (1 = "strongly disagree" and 5 = "strongly agree").

Hope. The variable hope is the mean of the six items of the PCQ about hope. An example of a hope item of the PCQ is "If I should find myself in a jam at work, I could think of many ways to get out of it". The items of hope will be answered by the employees on a 5 point Likert scale (1 = "strongly disagree" and 5 = "strongly agree").

Resilience. The variable resilience is the mean of five items of the PCQ about resilience. An example of a resilience item of the PCQ is "I usually take stressful things at work in stride". The items of resilience will be answered by the employees on a 5 point Likert scale (1 = "strongly disagree" and 5 = "strongly agree").

Self-efficacy. The variable self-efficacy is the mean of five items of the PCQ about self-efficacy. An example of a self-efficacy item of the PCQ is "When I experience obstacles in my work, I always find a way to by-pass those obstacles". The items of self-efficacy will be answered by the employees on a 5 point Likert scale (1 = "strongly disagree" and 5 = "strongly agree").

      According to reliability analyses the internal consistency reliability of the PCQ and the subscales varied from high to rather low, but the Cronbach's alphas were acceptable. The reliability coefficient for PCQ was .89 and for the PsyCap subscales the Cronbach's alphas were as follows: optimism .64; hope .80; resilience .66; and self-efficacy .61. One item of the optimism scale deleted due to a lack of reliability.

Work stress. The dependent variable work stress is measured by two scales.

1) *Work Stress Response Scale* (WSRS). The Lakaev Academic Stress Response Scale is a scale to examine study stress (Lakaev, 2009). We transformed the statements of this scale to work relevant items. The scale consists of 22 items divided in four subscales: affective (5 items), behavioral (8 items), physiological (5 items) and cognitive stress (4 items). An example of the WSRS affective subscale is "I felt emotional drained because of my job". Another example of the WSRS cognitive subscale is "I felt overwhelmed by the demands of my job". The items of the WSRS will be answered by the respondents on a 5 point Likert scale (1 = "never" and 5 = "very often").

2) *Workplace Stress Scale* (WSS). The Workplace Stress Scale (Marlin Company & American Institute of Stress, 2009) consists of 8 items measuring the frequency of feelings of work stress. An example of the WSS is "I feel that job pressures interfere with my family or personal life". The items of the WSS will be anwered by the respondents on a 5 point Likert scale (1 = "never" and 5 = "very often"). This scale measures the fit between the employee and his or her workplace.

The reliability coefficients of the WSRS with the affective, behavioral, physiological and cognitive components were .77, .80, .69 and .80, respectively. The total WSRS had a Cronbach's alpha of .91. The Cronbach's alpha of the WSS was .81.

Results

The means, standard deviations and results of the bivariate correlations of the PCQ and the work stress scales can be seen in Table 1. All Study 1 PsyCap variables were significantly positively correlated ($p < 0.01$). The PsyCap variables were significantly negatively correlated with the WSRS and WSS stress variables ($p < 0.05$). Moreover, all

variables showed skewness and kurtosis values that were well within the normal ranges, suggesting the data had a normal distribution.

Table 1. Means, standard deviations, and bivariate correlations of the variables of Study 1. Reliability coefficients (Cronbach's alphas) are listed in the diagonal.

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. PsyCap	3.95	.44	(.89)										
2. Optimism	3.91	.55	.86**	(.64)									
3. Hope	4.03	.54	.89**	.68**	(.80)								
4. Resilience	4.03	.50	.85**	.64**	.68**	(.66)							
5. Self-efficacy	3.79	.47	.78**	.58**	.60**	.52**	(.61)						
6. WSRS	1.74	.55	-.58**	-.56**	-.56**	-.50**	-.31**	(.91)					
7. Affective	1.64	.63	-.51**	-.52**	-.49**	-.40**	-.29**	.91**	(.77)				
8. Behavioral	1.92	.58	-.54**	-.51**	-.58**	-.44**	-.24*	.90**	.74**	(.80)			
9. Physiological	1.47	.54	-.42**	-.38**	-.36**	-.42**	-.24*	.78**	.65**	.57**	(.69)		
10. Cognitive	1.83	.79	-.56**	-.54**	-.50**	-.50**	-.33**	.90**	.81**	.74**	.63**	(.80)	
11. WSS	2.20	.68	-.62**	-.63**	-.55**	-.47**	-.43**	.73**	.67**	.59**	.61**	.71**	(.81)

* $p < 0.05$, ** $p < 0.01$; N = 90,

Table 1 provides the relationships for the separate and overall PsyCap scales and work stress scales. Full support was found for Hypotheses 1 regarding PsyCap having a significant negative relationship with both Work Stress Response Scale ($r = -.58$, $p < .01$) and Workplace Stress Scale ($r = -.62$, $p < .01$). Also all separate PsyCap subscales showed significant negative relationships with the two work stress scales ($p < .01$). So, employees' optimism, hope, resilience and self-efficacy are negatively related to work stress.

As can be seen in Table 2, the multiple regression with the PsyCap constructs as the predictors of work stress is significant, $F(4, 85) = 14.034$, $p < .001$. This model suggests that 39.8% of the variance in work stress is explained by the four PsyCap constructs ($R^2 = .398$). A high level of PsyCap predicts less work stress. Hope and optimism appear to be the most important predictors ($p < .05$). Those subscales explain 7.4% and 7.6%, respectively, of the

unique variance in work stress. There are no significant differences due to the sex and the age of the respondents.

Table 2. Multiple regression model results for Work Stress Response and Workplace Stress of Study 1.

	Work Stress Response Scale					Workplace Stress Scale			
Variable	B	std. error	β	t		B	std. Error	β	t
Constant	4.33	.43		10.02**		5.75	.53		10.94**
Optimism	-0.33	.13	-.33	-2.63*		-0.56	.15	-.45	-3.68**
Hope	-0.35	.13	-.35	-2.61*		-0.27	.16	-.22	-1.68
Resilience	-0.15	.13	-.14	-1.12		-0.03	.16	-.02	-.20
Self-efficacy	0.19	.13	.16	1.46		-0.03	.16	-.02	-.20

* p< 0.05, ** p < 0.01; N = 90

In addition, the PsyCap constructs explained 42,3% of the variance in Workplace Stress, $F(4, 85) = 15.608$, $p < .001$. Optimism appears to be the most important ($p < .001$) predictor of Workplace Stress, followed by hope which is marginally significant ($p = .096$). The construct optimism explains 13.7 % of the unique variance in Workplace Stress. When someone shows a high level of optimism, this predicts low workplace stress.

Overall, these findings extend the results and provide evidence that PsyCap accounts for unique variance when predicting work stress. The constructs optimism and hope appear to be the most important predictors. Therefore, this supports Hypotheses 2, 2a and 2b. Resilience and self-efficacy do not significantly explain unique variance in work stress, so Hypotheses 2c and 2d are rejected.

Discussion

The goal of Study 1 was to investigate whether employees' level of PsyCap is negatively related to their work stress. Furthermore this study tested whether employees' PsyCap constructs explain unique variance in employees' work stress. Extending previous research on PsyCap and undesirable employee attitudes (Liu et al., 2012), PsyCap has a

significant negative relationship with work stress. Also the separate PsyCap subscales relate negatively with work stress.

In total, PsyCap explains approximately 40% of the variance in work stress. A high level of employees' PsyCap predicts less work stress. Hope and optimism were the most important predictors, so these constructs account for unique variance when predicting work stress. While not all the separate PsyCap subscales account for unique variance, this extends the statement that PsyCap is a higher-order construct. PsyCap is not just made of the underlying constructs, but taken together they form an entity that is more than the sum of its parts (Luthans et al, 2007).

The present study showed a negative relationship between the PsyCap subscales and work stress. The results of Riolli, Savicki and Richards (2012) extend these results in the academic environment. PsyCap buffered the impact of study stress so that the relationship between study stress and negative outcomes was reduced. These findings show an interesting idea that by enhancing individuals' level of PsyCap by a training, we may be able to reduce stress. Although the cross sectional design in this study gave us insight into the relationship between PsyCap and work stress, experimental and longitudinal designs are needed to examine causality between these variables. With these designs Study 2 examines the impact of a PsyCap training on the level of study stress of students, to get insight if training more optimistic explanatory styles and more constructive envisioning of the future reduces stress.

Study 2

The research of Riolli, Savicki and Richards (2012) shows that training students to develop more optimistic styles, lower levels of distressed thinking, and more constructive envisioning of the future, may help less psychologically resilient students to cope with stress. Such training programs might be successful in terms of improving students' long-term health outcomes. When enhancing students' level of PsyCap is effective to reduce stress, such PsyCap trainings could be implemented as a part of general training that can be administered in the classroom.

The current study examines to enhance students' level of PsyCap in four training sessions. Students participate in this experimental study. The study investigates whether the participants' level of PsyCap significantly increases compared to a control group, and if this augmentation reduces their level of study stress.

Based on the discussed literature we expect that the PsyCap training will enhance the levels of the four PsyCap constructs and will have a positive effect on coping with stress. So, regarding the PsyCap training we hypothesize the following:

Hypothesis 3: Students who participated in the four PsyCap training sessions have a higher PsyCap level than they had before the training; and also have a higher PsyCap level than the students who had not participated in the training.

H3a: Trained students have more optimism after the four training sessions.

H3b: Trained students have more hope after the four training sessions.

H3c: Trained students have more resilience after the four training sessions.

H3d: Trained students have more self-efficacy after the four training sessions.

Hypothesis 4: Students who participated in the four PsyCap training sessions have less study stress than they had before the training; and also have less study stress than the students who had not participated in the training.

Method

Participants and design

The participants were 57 students (8 male, 49 female; mean age: 20.1, *SD* = 1.6) who study fulltime at a Dutch institution for higher education. The participants heard about this research via social media and e-mail of the researchers and trainers. No information was shared about the dependent variables of the present research. The participants participated voluntarily, no rewards were given. Half of the students participated during the training sessions, the other half did not participate in the training session. Furthermore, the participants were randomly assigned whether they should fill in the pretest or not. The design in this study is called a Solomon four-group design. This results in a two (training vs. control) by two (with vs. without pretest) group design. The use of such a design allows us to use measures of change in PsyCap within participants, while also testing for the presence of pretest sensitization. Testing the pretest sensitization gives insight whether assessing a pretest has effect on subjects in an experiment.

During this study six students dropped out. In the analysis of the pretest results (T1) all data of the 57 students were included. For comparing the pretest to the posttest and follow-up test, the analyses includes 51 students (7 male, 44 female; mean age: 20.0, *SD* = 1.5).

Procedure

The students were semi-randomly assigned to one of the two groups: experimental group or control group. Participants who wanted to participate in the PsyCap-training selected themselves to the experimental group. This study uses a Solomon four-group design. Figure 1 shows the procedure and the measurements of this study. Half of the students in the experimental group (group 1) participated in the pretest (T1), the training and the posttest (T2). The other half of the students in the experimental group (group 2) participated in the

training and the posttest (T2). The control group did not participate in the training. Half of the

students in the control group (group 3) participated in the pretest (T1) and posttest (T2). The

other half of the control group (group 4) only participated in the posttest (T2). The pretest was

a questionnaire which includes demographic questions and measures the independent and

dependent variables. All the participants did a follow-up test (T3). The posttest and the

follow-up test comprise the same questions of the independent and dependent variables

measured with the pretest. Filling in the questionnaire took about 5-10 minutes. At the start of

the first questionnaire it was mentioned that the students were participating on a voluntary

basis. All participants agreed on the informed consent procedure, which shows the

participants that they always have the possibility to stop whenever they want. They did not
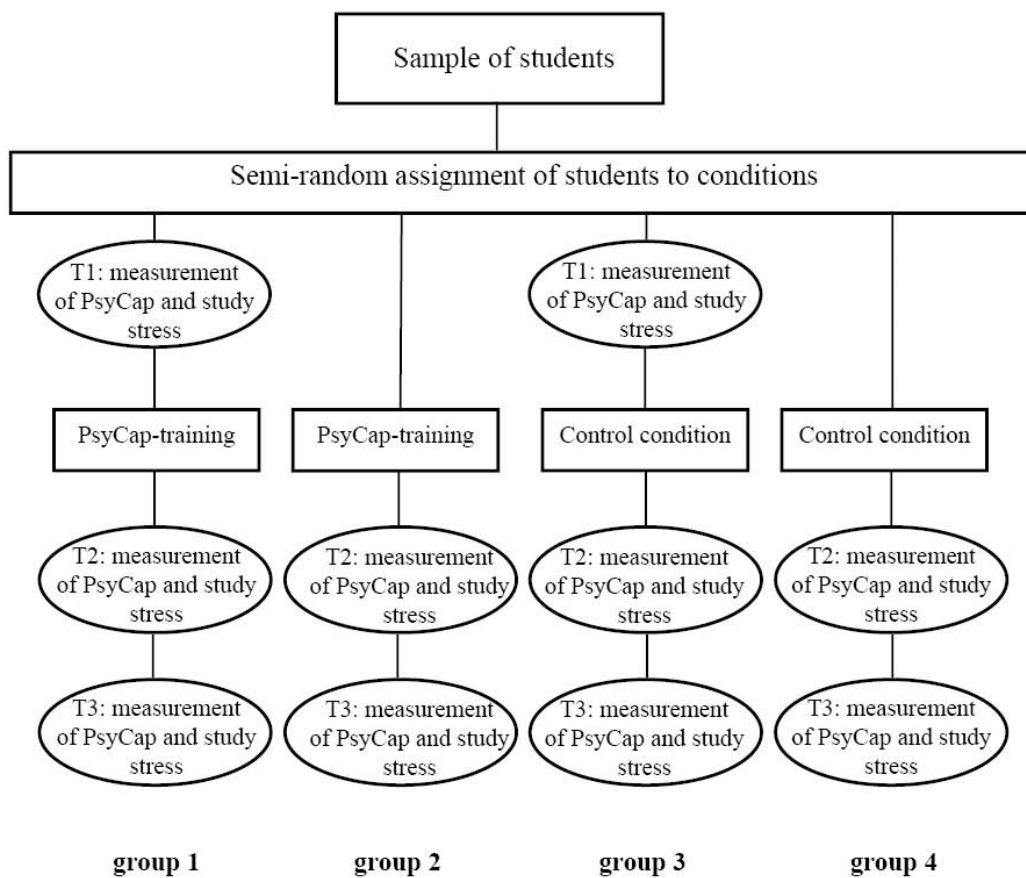
need to give any reason if they decide to quit.

Figure 1. Study 2: the Solomon four-group design with three measurements.

Shortly before the first training sessions half of the participants filled in the pretest. Afterwards, students in the experimental group got four workshops (approximately 2 – 2,5 hours each), whereby one PsyCap-construct was trained in one workshop. After completing the four workshops the participants filled in another questionnaire called the posttest (T2). The same variables were measured as during the pretest. Finally, six weeks after the last training sessions there was a follow-up test (T3): the students from the experimental group and the control group filled in the questionnaire again to test long-term effects.

The PsyCap workshops were given by two trainers having years of experience in training in the field of positive psychology. The trainers are members of the Dutch Institute of Psychology (NIP) and took the ethical regulations for psychologists into account when providing the training.

Material and measurement instruments

The data of this research are collected via an online questionnaire, which measured the subscales of PsyCap and study stress.

PsyCap. The PsyCap variable is a mean score for the 21 items of the Psychological Capital Questionnaire (PCQ). The statements of the PCQ were transformed into study-related items. The participants also used a 5 point Likert scale to indicate the level of agreement or disagreement with each PsyCap statement (1 = "strongly disagree" and 5 = "strongly agree"). See Study 1 for examples of the statements of the four PsyCap subscales.

According to reliability analyses of T2-test items the internal consistency reliabilities of the PCQ and the subscales varied from high to rather low. The reliability coefficient for PCQ was .89 and for the PsyCap subscales the Cronbach's alphas were as follows: optimism .54; hope .73; resilience .74; and self-efficacy .73. The reliability coefficients of the hope,

resilience and self-efficacy subscales are acceptable. One item of the optimism scale was deleted due to a lack of reliability.

Study stress. The Lakaev Academic Stress Response Scale (Lakaev, 2009) is used to assess participants' study stress. This questionnaire is comparable with the Work Stress Response Scale used in Study 1, only in the current study is study stress measured instead of work stress. The scale consists of 22 items divided in four subscales: affective (5 items), behavioral (8 items), physiological (5 items) and cognitive stress (4 items). See Study 1 for examples of the statements of stress scale.

The reliability coefficients of the study stress questionnaire of affective, behavioral, physiological and cognitive subscales were .83, .85, .62 and .80, respectively. The Cronbach's alpha of the total study stress was .90. We can assume that these post-test items reflect separate psychological constructs, but we should be careful with predictions regarding optimism.

Results

The means, standard deviations and results of the bivariate correlations of the PCQ and study-stress scales can be seen in Table 3. Identical to Study 1, all Study 2 PsyCap variables were significantly positively correlated ($p < .01$). The PsyCap variables were significantly negatively correlated with the study-stress variables ($p < .05$), except for the physiological subscale (*N.S.*). Moreover, all variables showed skewness and kurtosis values that were well within the normal ranges, suggesting the data had a normal distribution.

Table 3. Means, standard deviations, and bivariate correlations of study variables in Study 2. Reliability coefficients (Cronbach's alphas) are listed in the diagonal.

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. PsyCap	3.67	.48	(.89)									
2. Optimism	3.58	.55	.74**	(.54)								
3. Hope	3.77	.58	.91**	.58**	(.73)							
4. Resilience	3.65	.59	.84**	.52**	.67**	(.74)						
5. Self-efficacy	3.68	.57	.84**	.42**	.77**	.64**	(.73)					
6. Study stress	2.27	.63	-.52**	-.36**	-.49**	-.43**	-.47**	(.90)				
7. Affective	2.17	.81	-.48**	-.31*	-.47**	-.45**	-.36**	.90**	(.83)			
8. Behavioral	2.68	.84	-.40**	-.27*	-.37**	-.27*	-.42**	.83**	.59**	(.85)		
9. Physiological	1.75	.58	-.23	-.13	-.21	-.17	-.25	.52**	.47**	.15	(.62)	
10. Cognitive	2.21	.92	-.55**	-.46**	-.49**	-.49**	-.41**	.87**	.86**	.56**	.40**	(.80)

Note: * p< 0.05, ** p < 0.01; N = 57

Table 3 shows all of the relationships for the overall PsyCap, subscales and study-stress. The results of Study 2 extend the results in Study 1 regarding PsyCap having a significant negative relationship with study-stress ($r = -.52$, $p < .01$). A high level of PsyCap, predicts less study-stress. Also in this study, the separate PsyCap subscales showed all significant negative relationships with study-stress. So, students' optimism, hope, resilience and self-efficacy are negatively related to study-stress.

Effects of pre-testing

The current study uses a Solomon design which allows us to use measures of change in PsyCap within participants, but also testing for the presence of pretest sensitization. As shown in Figure 1, we distinguish between four groups of participants, depending on whether the participants participated the pretest (T1) or not, and whether they participated in the training or not: group 1 (pretest, training), group 2 (no pretest, training), group 3 (pretest, no training) and group 4 (no pretest, no training). All the groups filled in the posttest (T2) and the

follow-up test (T3). Before testing the effects of the training, we test the presence of pretest sensitization.

Analysis of differences in the scores of the posttest scores of group 1 and 2 show whether completion of the pretest had effect on the posttest scores or not. The PsyCap-constructs posttest scores of group 1 ($M = 3.64$, $SD = .49$) and group 2 ($M = 3.47$, $SD = .42$) were not significantly different, $t(25) = .960$, $p = .346$. This means there was no testing effect of the pretest prior to the training on the PsyCap posttest scores.

Analysis of differences in the scores on the PsyCap-constructs of the pretest (T1) of group 3 and the scores of the posttest (T2) of group 4 will show if external factors related to observing participants across time could be causing an effect. So with this analysis, we test if anything else could have caused differences in the level of PsyCap of group 3 and 4 during the time between T1 and T2. We expect no significant difference in the scores of the PsyCap-constructs of the pretest (T1) of group 3 and the scores of the posttest (T2) of group 4. Table 4 shows that the pretest scores of resilience, hope and self-efficacy of group 3 were not significantly different from the posttest scores of these constructs of group 4. This shows that there are no differences for resilience, hope and self-efficacy because of the passage of time. For the construct optimism there was a testing effect on time, $t(28) = -2.616$, $p = .014$. Group 4 ($M = 3.82$, $SD = .52$) was on T2 significantly more optimistic at T2 than group 3 ($M = 3.24$, $SD = .67$) on T1. However, we should be careful with drawing conclusions from the optimism subscale, because of the low reliability coefficient.

Table 4. t-test results comparing PsyCap pretest group 3 and posttest group 4

Variable	pretest group 3		posttest group 4		
	Mean	SD	Mean	SD	t-test
PsyCap	3.62	0.30	3.78	0.51	-0.905
Optimism	3.24	0.67	3.82	0.52	-2.616*
Hope	3.73	0.35	3.78	0.65	-0.272
Resilience	3.82	0.43	3.75	0.61	0.325
Self-efficacy	3.68	0.32	3.78	0.58	-0.509

* $p < 0.05$, ** $p < 0.01$; N = 30; $df = 28$

We compared the scores on the overall PsyCap-construct of the posttest of group 3 and group 4 to determine if including a pretest caused posttest scores to change, even when there was no training given. The total PsyCap-construct posttest scores of group 3 ($M = 3.79$, $SD = .46$) and group 4 ($M = 3.78$, $SD = .51$) were not significantly different, $t(28) = 0.012$, $p = .990$. The separate PsyCap subscales have similar results. When students did not participate in the training, there was no difference in their PsyCap-level when they participated in the pretest or not. This means there was no effect of filling in the pretest or not when students did not participate in the PsyCap- training.

Overall, we can conclude that there is no presence of pretest sensitization. Only for the construct optimism there was a testing effect on time. Group 4 was on T2 more optimistic than group 3 on T1. There was no effect whether the participants filled in the pretest or not.

Effects of training

To test whether participating of the PsyCap training caused changes from pretest to posttest scores we compare the difference in pretest-posttest scores of group 1 to the difference in pretest-posttest scores of group 3. Table 5 shows the t-test results of comparing the participants' PsyCap level of group 1 on T1 and T2. We can conclude that the training significantly increased the total PsyCap of the participants who joined the training, $t(12) = 2.102$, $p < .05$. Furthermore, also self-efficacy, $t(12) = 1.865$, $p < .05$, and resilience, $t(12) =$

1.945, $p < .05$, were increased significantly by the training. The constructs optimism, $t(12) = 1.655$, $p = .062$, and hope, $t(12) = 1.648$, $p = .063$, were increased by the training, but only marginally.

Overall, these findings provide full support for Hypothesis 3, that the four training sessions increased the participants' level of PsyCap significantly compared to PsyCap level before the training. Resilience and self-efficacy were also increased by the training, so Hypotheses 3, 3c and 3d are accepted.

Table 5. t-test results comparing PsyCap pretest (T1) and posttest (T2) of group 1 and 3

	pretest group 1			posttest group 1		
Variable	Mean	SD		Mean	SD	t-test
PsyCap	3.37	.64		3.64	.49	2.102*
Optimism	3.23	.62		3.48	.41	1.655
Hope	3.54	.87		3.85	.56	1.648
Resilience	3.25	.76		3.52	.63	1.945*
Self-efficacy	3.43	.54		3.66	.56	1.865*

	pretest group 3			posttest group 3		
Variable	Mean	SD		Mean	SD	t-test
PsyCap	3.62	.30		3.79	.46	1.537
Optimism	3.24	.57		3.58	.78	1.645
Hope	3.73	.35		3.93	.49	2.092*
Resilience	3.82	.43		3.86	.55	0.480
Self-efficacy	3.68	.32		3.74	.58	0.355

* p< 0.05, ** p < 0.01; group 1: N = 13; *df* = 12, group 3: N = 10, df = 9

Furthermore, we compared the difference in the pretest-posttest scores of group 3 to show whether PsyCap increased in the control condition. We can conclude that PsyCap slightly increased when comparing T1 ($M = 3.62$, $SD = .30$) and T2 ($M = 3.79$, $SD = .46$), this result was only marginally significant, $t(9) = 1.537$, $p = .080$. Furthermore, the pretest ($M =$

3.68, $SD = .32$) and posttest ($M = 3.74$, $SD = .58$) of self-efficacy, $t(9) = 0.355$, $p = .365$, and

pretest ($M = 3.82$, $SD = .43$) and posttest ($M = 3.86$, $SD = .55$) of resilience, $t(9) = 0.480$, $p =$

.321, were not significantly different. The PsyCap construct optimism increased marginally

on T2 ($M = 3.58$, $SD = .78$) compared with T1 ($M = 3.24$, $SD = .67$), $t(9) = 1.645$, $p = .067$.

At last, the PsyCap construct hope increased significantly on T2 ($M = 3.93$, $SD = .49$)

compared with T1 ($M = 3.73$, $SD = .35$), $t(9) = 2.092$, $p < .05$. The level of PsyCap of the

participants in group 3 are slightly higher compared to the participants in group 1, when

comparing T1 and T2.

A two-way ANOVA was conducted to examine the effect of pretest and training on

the participants level of PsyCap on T2. There was no main effect of pretest on the level of

PsyCap, $F(1, 54) = 0.349$, $p = .557$. Also, no main effect of training on the level of PsyCap

was found, $F(1, 54) = 0.527$, $p = .471$. There was no significant interaction effect between

participating in the training and doing the pretest, on the level of PsyCap, $F(1, 54) = 0.527$, p

$= .471$. These results are in line with previous findings that the pretest did not have an effect

on the level of PsyCap of the participant. Contrary to what we expected, there is no main

effect of training on the level of PsyCap. This means that there is no significant difference in

the participants' level of PsyCap between the participants who took part in the training

sessions and the participants who did not take part in the training sessions.

To explain that no significant main effect of training was found, an extra analysis

between the PsyCap levels of group 2 and 4 for the posttest (T2) was conducted. This analysis

showed that the level of PsyCap of the students in group 4 ($M = 3,78$, $SD = .53$) was

significantly higher than the PsyCap level of the students in group 2 ($M = 3,41$, $SD = .43$),

$t(26) = -1.987$, $p < .05$. This might indicate that the participants in the control condition of

group 4 already had a higher PsyCap level than the participants in the experimental condition

of group 2. The relatively short training did not succeed in increasing the low PsyCap level

sufficiently for participants in group 2 to enhance their PsyCap level more than the level of PsyCap of participants in group 4.

Long-term effects

To test whether participation in the PsyCap training has long-term effects, we compared the difference of the pretest (T1) and the follow-up test(T3) scores for group 1 (pretest and training) to the difference in pretest-follow up test scores of group 3 (pretest and control). Table 6 shows the t-test results of comparing participants' PsyCap level on T1 and T3.

Table 6. t-test results comparing PsyCap pretest and follow-up test of group 1 of Study 2

Variable	pretest group 1			follow-up test group 1		
	Mean	SD		Mean	SD	t-test
PsyCap	3.37	.64		3.59	.64	1.926*
Optimism	3.23	.62		3.31	.73	0.647
Hope	3.54	.87		3.77	.86	1.247
Resilience	3.25	.76		3.48	.74	1.778*
Self-efficacy	3.43	.54		3.66	.61	1.677*

* p< 0.05, ** p < 0.01; N = 13; *df* = 12

We can conclude that the training significantly increased the PsyCap level of the participants, $t(12) = 1.926$, $p < .05$. Furthermore, resilience, $t(12) = 1.778$, $p < .05$, increased significantly following the training. Self-efficacy, $t(12) = 1.677$, $p = .060$, increased marginally following the training. Optimism and hope did not significantly increase.

Overall, these findings provide evidence that the four training sessions also yielded also long-term effects in increasing the participants' overall level of PsyCap. After a while, resilience and self-efficacy were still increased by the training, therefore Hypotheses 3, 3c and 3d are accepted.

The difference of the pretest and follow-up test scores of group 3 (pretest and control) show whether PsyCap increased in the control condition on the long term. Our results show a

marginal increase in PsyCap from T1 (M = 3.72, SD = .28) to T3,(M = 3.87, SD = .32), t(8) = 1.517, p = .084. Furthermore, we also found a marginally significant increase in hope from T1 (M = 3.72, SD = .33) to T3 (M = 3.96, SD = .49), t(8) = 1.667, p = .067. No significant increase in optimism was found when comparing the pretest (M = 3.51, SD = .46) to the follow-up test (M = 3.72, SD = .28), t(8) = 1.079, p = 0.156. Additionally, no significant increase was found in resilience when comparing T1 (M = 3.87, SD = .45) to T3 (M = 3.91, SD = .33), t(8) = 0.389, p = .354, or in self-efficacy from T1 (M = 3.76, SD = .33) to T3 (M = 3.80, SD = .49), t(8) = 0.326, p = .377.

A two-way ANOVA was conducted to examine the effect of pretest and training on the participants' level of PsyCap at T3. There was no main effect of pretest on the level of PsyCap, F(1, 46) = 0.013, p = .910. There was a marginally significant main effect of training on the level of PsyCap, F(1,46) = 3.658, p < .062. However, the PsyCap level of the participants who had joined the training sessions (M = 3.58, SD = .53) was lower than the PsyCap level of participants who did not join the training sessions (M = 3.86, SD = .45). There was no significant interaction effect between participating in the training and doing the pretest, on the level of PsyCap on T3, F(1,46) = 0.001, p = .975. These results extend the previous findings that pretest had no effect on the level of PsyCap. However, against our expectations, at T3 the participants who joined the training had lower PsyCap than the participants who did not join.

A one-way repeated measures ANOVA was conducted to examine the effect of the PsyCap training at the three measurement moments (T1, T2, and T3). The results of the ANOVA indicated a non-significant time effect, Wilks' Lambda = .742, F(2, 10) = 1.742, p = .224, η^2 = .26. Although there was no significant increase in PsyCap level over time, Figure 2 shows a pattern in the expected direction. An increase of PsyCap level shortly after the

training (T2) is seen compared to the level of the PsyCap before the training (T1). This increase appears to stabilize over time (T3).
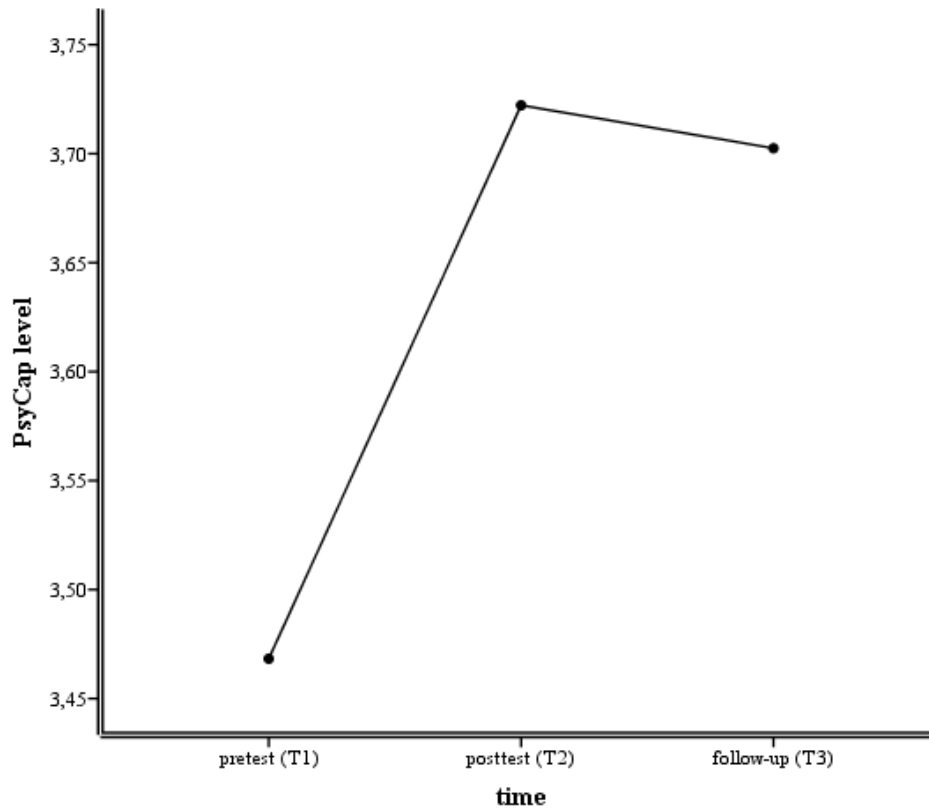

Figure 2. Development of students' level of PsyCap on three measuring moments of Study 2.

Study stress

As can be seen from Table 7, the multiple regression with the PsyCap constructs as the predictors of study stress on T1 is significant, $F(4, 20) = 7.228$, $p < .001$. This model suggests that 84,7% of the variance in study stress is explained by the four PsyCap constructs ($R^2 = .847$). Optimism and hope appear to be the most important predictors ($p's < .05$). These subscales explain 10,8% and 6,6%, respectively, of the unique variance in study stress. So, when someone shows a high level of optimism or hope, this predicts low study stress. There were no significant differences due to the sex and the age of the respondents.

Table *7*. Multiple regression model results for study stress on T1 of Study 2

		Study stress		
Variable	B	std. error	β	t
Constant	5.57	.58		9.63**
Optimism	-.44	.16	-.46	-2.76*
Hope	-.43	.20	-.46	-2.15*
Resilience	.16	.17	.17	.90
Self-efficacy	-.25	.27	-.19	-.91

* p< 0.05, ** p < 0.01; N = 24

Overall, these findings provide evidence that PsyCap accounts for unique variance when predicting study stress. The constructs optimism and hope appear to be the most important predictors.

To test whether participating in the PsyCap training caused changes in the stress level of the students, we compare the pretest, posttest and follow-up test scores of group 1. We can conclude the participants' stress level decreased when comparing stress level before the training (M = 2.31, SD = .69) and shortly after the training (M = 2.08, SD = .38), but only marginally significant $t(12)$ = -1.594, p = .069. The cognitive component of study-stress decreased the most following the PsyCap training when we compare the students' stress level before (M = 2.48, SD = 1.03) and shortly after the training (M = 2.08, SD = .65), $t(12)$ = -1.849, p < .05. A marginally significant decrease of the affective component was found when comparing the pretest (M = 2.26, SD = .76) and posttest (M = 2.03, SD = .53), $t(12)$ = -1.429, p = .089. The behavioral and physiological component did not decrease significantly.

On the long-term, the level of stress did not significantly decrease when comparing the pretest (M = 2.31, SD = .69) and the follow-up test (M = 2.16, SD = .68), $t(12)$ = -0.774, p = .227. Comparable results were found for the separate stress components.

The results provide evidence that study stress is decreased shortly after participating in the PsyCap training (Hypothesis 4). The training had the most influence on the cognitive and

affective components of study stress. On the long term the PsyCap training did not yield a stable significant decrease of study stress.

Discussion

The goal of Study 2 was to investigate whether a PsyCap training of four sessions increased students' level of PsyCap, and if this augmentation reduces their level of study stress. First of all, the results of the current study extend the findings of previous research and Study 1: PsyCap has a significant negative relationship with study stress. Also, the separate PsyCap subscales showed all significant negative relationships with study stress.

This study used a Solomon four-group design which allowed us to use measures of change in PsyCap within participants, and to examine for the presence of pretest sensitization. After the training sessions, the PsyCap level of the participants who filled in the pretest before the training was not significantly different from the PsyCap level of the participants who did not complete the pretest. We can conclude there was no pretest sensitization in this study. Regarding the training effects we expected that the PsyCap level of the participants was increased after the four training sessions. This study confirmed these expectations: the participants who participated in the training had a significantly increased level of PsyCap. During the training sessions, resilience and self-efficacy were increased shortly after the last session. Furthermore, long-term results of this study showed that the increase in PsyCap-level maintained. The levels of resilience and self-efficacy were still increased at the six weeks follow up, compared to the pretest.

In total PsyCap explains approximately 85% of the variance in study stress. A high level of students' PsyCap, predicts less study stress. Optimism and hope appear to be the most important predictors, so these constructs account for unique variance when predicting study stress. Consistent with Study 1, in Study 2 not all the separate PsyCap subscales account for

unique variance. This extends the statement that PsyCap is a higher-order construct. Shortly after the last PsyCap training the participants' stress level was decreased compared to stress level before the training. On the long-term, there were no significant findings in this study, however.

When we take all this together, we can conclude that training more optimistic explanatory styles and more constructive envisioning of the future, enhances students' level of PsyCap, and decreases their level of study stress. The PsyCap training increases participants' level of PsyCap with 8%. These results extend the support for the micro-interventions of Luthans and et al. (2006). Although the separate PsyCap subscales were assumed to change during the course of the training, this study found again that PsyCap appears to be a core construct where the whole is greater than the sum of its parts. Practically this means that the participants experience a result greater than the sum of the four components of the training (Luthans, et al, 2007).

The current study showed that enhancing students' level of PsyCap, reduces their level of study stress shortly after the training. In a third study we want to combine the findings of Study 1 concerning the negative relation between employees' PsyCap and work stress, and Study 2, which shows that training PsyCap reduces study stress. The results of the second study suggest that training PsyCap could be a possible solution in reducing employees' work stress. Therefore, Study 3 examines the impact of a PsyCap training on the level of work stress of employees.

Study 3

So far, Study 1 and Study 2 provide evidence that PsyCap negatively relates to work stress and study stress. Furthermore, the PsyCap training showed favorable results shortly after the training, because the training increased students' level of PsyCap. The current study examines the PsyCap training with employees of a small-size company as participants. The study investigated whether the PsyCap training is also effective in a workplace setting.

Congruent to the hypotheses of Study 2 we expect that the PsyCap training will enhance the levels of the four PsyCap-subscales and it will have a positive effect on coping with stress. We hypothesize the following:

Hypothesis 5: Employees who participated in the PsyCap training sessions have a higher PsyCap level than they had before the training.

H5a: Trained employees have more optimism after the training sessions.

H5b: Trained employees have more hope after the training sessions.

H5c: Trained employees have more resilience after the training sessions.

H5d: Trained employees have more self-efficacy after the training sessions.

Hypothesis 6: Employees who participated in the PsyCap training sessions have less work stress than they had before the training.

Method

Participants and design

This research is done at a small-sized organization with 19 employees working as industrial medical officers (16 male, 3 female; mean age: 49.5, *SD* = 7.8) participating in this study. The employers informed their employees about participating in the training and about the construct Psychological Capital, but no information was shared about the dependent

variables of the present research. This study was about the theoretical model of the relationship between PsyCap and work stress, and an evaluation of a PsyCap training. The previous study used a Solomon four group design, but because of practical reasons – in particular, the small size of the research group - it was not possible to use the same design in this study. The current study used a one group pretest posttest design, in which the variables will be measured two times during a period of 3 weeks.

Important to note is that because of dropouts the results of pretest (T1) were analyzed with 19 employees, while later on when pretest and posttest were compared the analyses used 16 employees (13 male, 3 female; mean age: 49.8, SD = 7.2). The reasons why three employees dropped out were unknown.

Procedure

The employees participated in the pretest (T1) prior to the first training session. The pretest was a questionnaire including demographic questions and measures the variables. In contrast with the four training sessions the students received, the participants in Study 3 received two training sessions which discussed 2 PsyCap-constructs. In the first training session, optimism and resilience were discussed and two weeks later in the second training, hope and self-efficacy were trained. Shortly after the last training, the participants participated in the posttest (T2). The posttest consisted of questions of the variables too. Filling in the questionnaire took about 5-10 minutes. At the start of the first questionnaire it was mentioned that the employees are participating on a voluntary basis. The employees always had the possibility to stop whenever they want. They did not need to give any reason if they decided to quit.

The PsyCap workshops were given by two trainers, having years of experience in training in the field of positive psychology. The trainers are both members of the Dutch

Institute of Psychology (NIP). In this study and during the training the Ethics Code of the NIP

was followed.

Material and measurement instruments

The data of this research were collected via an online questionnaire, which measures

the variables PsyCap, hope, optimism, resilience, self-efficacy and work stress.

PsyCap. Identical to Study 1 the PsyCap variable is a mean score for the 21 items of the

Psychological Capital Questionnaire (PCQ). The trainees used a 5 point Likert scale to

indicate their level of agreement or disagreement with each PsyCap statement (1 = "strongly

disagree" and 5 = "strongly agree"). See Study 1 for examples of the statements of the four

PsyCap subscales.

According to reliability analyses the internal consistency reliability of the PCQ and the

subscales on T1 varied from high to low, but the Cronbach's alphas were acceptable. The

reliability coefficient for the PCQ was .89 and for the PsyCap subscales were the Cronbach's

alphas as follows: optimism .79, hope .66, resilience .66; and self-efficacy .77. One item of

the optimism scale was deleted due to a lack of reliability.

Work stress. In this study the same scales were used as in Study 1: the Work Stress Response

Scale (WSRS) and the Workplace Stress Scale (WSS). The WSRS consists of 22 items

divided in four subscales: affective, behavioral, physiological and cognitive. See Study 1 for

an example of a statement of the WSRS. The WSS consists of 12 items measuring frequency

of the feelings of work stress. The trainees used a 5 point Likert scale to indicate their level of

Workplace Stress (1 = "never" and 5 = "very often"). See Study 1 for an example of a

statement of the WSS.

The reliabilities of the Work Stress Response Scale with the affective, behavioral, physiological and cognitive stress components were .86, .74, .67, .87. The total WSRS had a Cronbach's alpha of .93. The Cronbach's alpha of the Workplace Stress Scale was .87.

Results

Table 8 shows the means, standard deviations and results of the bivariate correlations of the PCQ, the work stress scales. The PsyCap variables were negatively correlated with the stress variables, but not all correlations were significant. Moreover, all variables demonstrated skewness and kurtosis values that were well within the normal ranges, suggesting that the data had a normal distribution.

Table 8. Means, standard deviations and bivariate correlations of study variables of Study 3. Reliability coefficients (Cronbach's alphas) are listed in the diagonal.

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. PsyCap	3.95	.37	(.89)										
2. Optimism	3.86	.67	$.83^{**}$	(.79)									
3. Hope	4.05	.43	$.91^{**}$	$.75^{**}$	(.66)								
4. Resilience	4.00	.45	$.78^{**}$	$.58^{**}$	$.66^{**}$	(.66)							
5. Self-efficacy	3.91	.53	$.64^{**}$	.28	$.48^{*}$	$.53^{*}$	(.77)						
6. WSRS	1.57	.47	$-.60^{**}$	$-.59^{**}$	$-.59^{**}$	$-.53^{*}$	-.21	(.93)					
7. Affective	1.46	.54	$-.58^{**}$	$-.57^{*}$	$-.58^{**}$	$-.48^{*}$	-.10	$.94^{**}$	(.86)				
8. Behavioral	1.71	.48	$-.64^{**}$	$-.66^{**}$	$-.61^{**}$	$-.52^{*}$	-.33	$.94^{**}$	$.81^{**}$	(.74)			
9. Physiological	1.32	.40	-.20	-.15	-.18	-.35	.09	$.78^{**}$	$.73^{**}$	$.61^{**}$	(.67)		
10. Cognitive	1.72	.69	$-.62^{**}$	$-.62^{**}$	$-.64^{**}$	$-.52^{*}$	-.29	$.94^{**}$	$.88^{**}$	$.87^{**}$	$.61^{**}$	(.87)	
11. WSS	2.01	.65	$-.61^{**}$	$-.77^{**}$	$-.67^{**}$	-.36	-.17	$.70^{**}$	$.59^{**}$	$.72^{**}$	.32	$.79^{**}$	(.87)

$* p < 0.05, ** p < 0.01; N = 19$

As shown in Table 8, the results extend the findings in Study 1 and 2 regarding PsyCap having a significant negative relationship with both Work Stress Response Scale ($r = -.60$, $p < .01$) and Workplace Stress Scale ($r = -.61$, $p < .01$). So, employees' PsyCap is negatively related to work stress. Also, optimism, hope, and resilience showed significant

negative relationships with the WSRS ($p < .05$). Furthermore, optimism and hope showed significant negative relationships with the WSS ($p < .01$). Also the PsyCap subscales showed significant negative relationships with the work stress components ($p < .05$), except for the physiological component.

As can be seen from Table 9, the multiple regression with the PsyCap subscales as the predictors of work stress is marginally significant, $F(4, 14) = 2.642$, $p = .078$. This model suggests that 65,6% of the variance in Work Stress Response Scale is explained by the four PsyCap constructs ($R^2 = .656$). A high level of PsyCap predicts less work stress. The individual PsyCap subscales did not explain unique variance in work stress.

Table 9. Multiple regression model results for Work Stress Response Scale and Workplace Stress Scale on T1 of Study 3

Variable	Work Stress Response Scale				Workplace Stress Scale			
	B	std. error	β	t	B	std. error	β	t
	4.13	1.00		4.14**	5.07	1.10		4.60**
Optimism	-.19	.22	-.27	-.86	-.61	.24	-.63	-2.50*
Hope	-.30	.38	-.28	-.79	-.54	.42	-.36	-1.29
Resilience	-.27	.30	-.26	-.89	.28	.33	.20	.85
Self-efficacy	.12	.22	.14	.55	.10	.24	.08	.40

* p< 0.05, ** p < 0.01; N = 19

The multiple regression with the PsyCap subscales as the predictors of the Workplace Stress Scale produced an $R^2 = .799$, $F(4, 14) = 6.188$, $p < .05$, as shown in Table 9. Optimism appears to be the most important ($p < .05$) predictor of the Workplace Stress Scale. The construct optimism explains 16.0% of the unique variance in the Workplace Stress Scale. So, when someone shows a high level of optimism, this predicts low work stress.

Overall, these findings provide evidence that PsyCap accounts for unique variance when predicting work stress, which is in line with the previous studies. The construct optimism appears to be the most important predictor. Hope, resilience and self-efficacy do not explain significant unique variance in work stress.

Effects of training

To test whether the PsyCap training caused an increase in the PsyCap level of the employees, we compare the difference of the pretest and posttest scores. Table 10 shows the t-test results of comparing the participants' PsyCap level at T1 and T2. We can conclude that the training significantly increased the total PsyCap of the participants, $t(15) = 2.434$, $p < .05$. Furthermore, also optimism, $t(15) = 3.282$, $p < .01$, hope, $t(15) = 2.301$, $p < .01$, and resilience, $t(15) = 2.030$, $p < .05$, were increased significantly by the training.

Overall, these findings provide evidence that the four training sessions increased the participants' level of PsyCap significantly. Optimism, hope and resilience were also increased by the training, so Hypotheses 5, 5a, 5b, and 5c are accepted.

Table 10. t-test results comparing PsyCap pretest and posttest of Study 3

Variable	pretest			posttest		
	Mean	SD		Mean	SD	t-test
PsyCap	3.93	.38		4.17	.45	2.43*
Optimism	3.83	.71		4.16	.59	3.28**
Hope	4.05	.46		4.30	.56	2.30*
Resilience	3.99	.43		4.20	.49	2.03*
Self-efficacy	3.90	.58		4.06	.49	.810

* p< 0.05, ** p < 0.01; N = 16; *df* = 15

Work stress

To test whether participating in the PsyCap training also decreased the work stress level of the employees, we compared the pretest and the posttest scores of the level of work stress. We can conclude that the participants' level of work stress is significantly decreased when we compare the work stress level measured by the WSRS before the training ($M = 1.64$, $SD = .47$) and after the training ($M = 1.53$, $SD = .45$), $t(15) = -2.124$, $p < .05$. The affective component of work stress has decreased the most by the PsyCap training when we compare the employees' affective level of work stress before ($M = 1.54$, $SD = .56$) and after ($M = 1.34$,

SD = .49) the training, *t*(15) = -2.582, *p* < .01 . Furthermore, the behavioral component of work stress showed a marginally significant decrease when comparing the pretest (*M* = 1.78, *SD* = .49) and posttest (*M* = 1.68, *SD* = .48), *t*(15) = -1.386, *p* = .093. Also, the cognitive component of work stress showed a marginally significant decrease when comparing with the pretest (*M* = 1.84, *SD* = .67) and posttest (*M* = 1.67, *SD* = .64), *t*(15) = -1.546, *p* = .072. The physiological component of work stress did not change when we compared the pretest (*M* = 1.35, *SD* = .42) and the posttest (*M* = 1.36, *SD* = .41), *t*(15) = 0.235, *p* = .409.

In contrast to what we had hypothesized, the scores of the WSS did not show a significant decrease participating the PsyCap training. The scores remained unchanged when we compared the scores before (*M* = 2.09, *SD* = .68) and after (*M* = 2.10, *SD* = .67) the training, *t*(15) = .103, *p* = .460.

Overall, these findings suggest that the PsyCap training decreases work stress partly. The affective component of work stress has decreased the most. Also the behavioral and cognitive component slightly decreased after the PsyCap training (Hypothesis 6). Against our predictions, the physiological component of work stress response and the levels of the WSS did not show a significant decrease of the participants' level of work stress after the PsyCap training.

Discussion

The purpose of this study was to investigate whether employees' level of PsyCap increased by a PsyCap training. Furthermore, this study tested whether that reduces the level of work stress of the employees. Supporting our hypotheses we found that PsyCap predicts approximately 65% of the variance in work stress. A high level of PsyCap, predicts less work stress. Participating in the training increased the employees level of PsyCap significantly with more than 6%. Optimism, hope and resilience were also increased significantly by the PsyCap

training. In addition, the results of Study 3 show that the level of work stress measured by the WSRS decreases after participating in the training. The affective component of work stress has decreased the most by the PsyCap training, followed by the behavioral and cognitive component which decreased slightly.

In contrast to Study 1 and Study 2, Study 3 only found a significant negative relationship between some of the PsyCap subscales and work stress. We assume not all subscales showed this significant relation due to the small sample size of Study 3, since previous studies using larger samples did find a significant negative relationship.

Contrary to the design of Study 2, the current design did not allow us to conclude that the results found in this study are only because of the training. We do not know if the increase in the level of PsyCap and the decrease in work stress is because of the training or because of other unknown effects. It would have been desirable to have a control group in this study, too, to be able to explain the change of the level of PsyCap of the participants by the effect of the training.

General discussion

The number of factors contributing to workplace stress have increased over the last years. Heavier workloads and increased travel for business, but also technological change and managerial bullying affect stress levels. More than 30 percent of the work related absence in the Netherlands is caused by workload or work stress (TNO, 2013). In short, there is an increasing demand for new perspectives and practical research on stress reduction to protect against the consequences of work stress. First, the purpose of the present research was to examine whether Psychological Capital and work stress are negatively related. Secondly, this research examines whether PsyCap could be increased by a training, and if this increase reduces stress in the workplace.

Extending previous research on PsyCap and undesirable employee attitudes (Liu et al., 2012), PsyCap has a significant negative relationship with work stress (Hypothesis 1). The separate PsyCap subscales relate negatively with work stress (H1a-d), as well as with study stress. PsyCap explains approximately 40% of the variance in work stress and 85% of the variance in study-stress. A high level of PsyCap predicts less work stress or study stress. Optimism and hope appear to be the most important predictors, so these constructs account for unique variance when predicting work (H2a, H2b) or study stress. Furthermore, Study 2 and 3 examined the impact of a PsyCap training on study stress and work stress, respectively.

We conclude that training students and employees more optimistic styles, lower levels of distressed thinking, and more constructive envisioning of the future is effective to increase participants' level of PsyCap (Hypothesis 3). Resilience and self-efficacy were increased after the training session in Study 2, on the short as well as the long term (H3c, H3d). Furthermore, Study 3 showed an increase in employees' level of optimism, hope, and resilience after the training (H5a, H5b, H5c). Study 2 showed that the PsyCap training decreases study stress shortly after the last training (Hypothesis 4). In addition, Study 3 showed that the affective

component of work stress decreased the most after the PsyCap training. The behavioral and cognitive component of work stress decreased slightly after PsyCap training (Hypothesis 6).

The fact that resilience and self-efficacy do not explain significant unique variance of stress can be explained if we assume that these constructs show multicollinearity. The high intercorrelation of the PsyCap-constructs show that the PsyCap-variables may measure partly the same construct. However, because the total level of PsyCap explains significant unique variance of work stress and study stress, this supports the statement of Luthans et al. (2007) that PsyCap is a higher-order construct, together the PsyCap subscales form an entity that is more than the sum of its parts. Another interesting finding is the fact that student's optimism and hope were not significantly increased by the training in Study 2, while in Study 3 the employees' level of hope, optimism and resilience were increased significantly. The difference in improvement of the PsyCap subscales can be explained if we assume that the two trainers, who trained the students first and later the employees, improved their skills in training PsyCap. The set-up and some exercises of the training in Study 3 were revised after Study 2, based on what worked and what did not in the training sessions with the students. Furthermore, the trainers trained one group of students each, while during the training sessions of the employees, the trainers trained one group of employees together. Training together made it possible for the trainers to complement one another. These adaptations could explain the stronger increases in the employees' level of PsyCap in Study 3. This suggests that an optimal set-up of the training could even lead to higher increases of the level of PsyCap.

The PysCap-training in Study 2 decreased study stress shortly after the training, while there was no significant decrease of study stress after six weeks. This suggests that it could be necessary to continue PsyCap training sessions to maintain the decreased level of study stress.

However, more research should is required to find out if this could be a solution on the long term.

Furthermore, an analysis of variance in Study 2 showed that there were no differences in PsyCap level between the students who participated in the training and those who did not. Additionally, on the long term this analysis showed contrary to what we had expected that the trained students had a lower level of PsyCap than the students who did not participate in the training. This might indicate that the participants in the control condition already had a higher PsyCap level than the participants in the training condition. An extra executed analysis showed that shortly after the training the group who did not participate in the training had higher levels of PsyCap, than the participants who participated in the training. These findings suggest that the two groups who did not complete the pretests already had a significantly different level of PsyCap before the training. In the current research it was not possible to fully randomly assign the students to the four groups. Although we were able to randomly assign students to the pretest or no-pretest condition, we were not able to use random assignment to the experimental versus control condition. Students who were interested in participating in the training after reading an online handout, were participants of the experimental group. Thus, in the experimental group, the participants' motivation to develop their PsyCap level could be a causal factor in the obtained results. It could also lead to an increased interest in the training for people who experience more adversities in life. The students who thought they had to learn how to be resilient when facing adversities applied to participate in the training.

At first sight the four PsyCap subscales appear to be interchangeable and to have considerable overlap. Some of the components of the constructs appear to be the same. For example, self-efficacy, a belief in one's capabilities to execute an action, shares some similarity to the willpower component of hope. However these two differ because hope does

contain the pathways component, while self-efficacy is more about the faith in abilities. Snyder (2002, p. 58) notes about the difference between hope and self-efficacy that "an important difference here lies with the words 'can' and 'will', with the former referring to the capacity to act and the latter reflecting the intention to act." Another example of the suggested overlap of PsyCap constructs occurs when we compare hope and optimism. Optimism is the expectation of succeeding now and in the future, which is similar to a component of hope in that both share an emphasis on persistence (Magaletta & Oliver, 1999). However, the two constructs differ in the fact that optimism does not consider the pathways by which desired outcomes will be achieved. Comparable overlap is found in the constructs resilience, optimism and self-efficacy. It is important to note that empirical research has demonstrated that these four resources have convergent, but importantly also discriminant, validities (e.g. Chen & Lim, 2012; Bryant & Cvengros, 2004), so there is a clear distinction between the four PsyCap constructs. This allows us and organizations to target a specific PsyCap component through training sessions, depending on the specific needs of the organization.

Limitations and strengths

In spite of the experimental design, use of control groups, and longitudinal research of Study 2, there are also some potential limitations that need to be recognized. First, more than expected, during the research participants dropped out. The reasons for quitting the research were diverse and sometimes unknown, but we know that some participants stopped because they were too busy. The dropouts of these participants distort the results, because initially equivalent groups lose their equivalence during the research. Furthermore, we do not know whether the participants dropped out because of a low or high level of PsyCap or a low or high level of stress. Anyway, the dropouts may have influenced the results. Additionally, because of a large number of dropouts the sample size showed a large decrease. Although it is

harder to find significant outcomes with small sample sizes, we did find significant effects when using small groups. Therefore it would be interesting to do the same study with a larger sample size. Another sample limitation is the fact that our sample was drawn from students derived from the same city where they study. It is possible that students in Leiden have a higher or lower level of PsyCap than students of other cities. Based on these limitations, future research should validate our findings with a more diverse and larger group.

Secondly, another potential limitation of the current research is that we collected the stress measures via a self-reported questionnaire, while it is also interesting to see how participants of the experimental and control group behave in an experiment with a stressful setting. Besides examining whether the participants behave stressfully, also physiological measurement equipment can measure physical reactions, like heartbeat, breath, muscle twitches and skin conduction.

Although there are always suggestions for improvement for a research, these three studies also have their strengths. First of all, this research demonstrated in three different sample sizes the negative relationship between PsyCap and work or study stress. Furthermore, Study 2 and 3 show in two different populations that PsyCap could increase after a training.

The Solomon four group design used in Study 2 is very strong. This design gave us complete control over the variables and allowed us to check that the pretest and extraneous factors did not influence the results. While not all the analyses showed significant results, most of the outcomes were in the direction of what we were expecting. The current research used small sample sizes, which makes it difficult to find significant results. This suggests that in future research with larger samples even more significant results in the current direction may be found.

Implications

The findings of this research also have important practical implications for organizations and educational institutes. PsyCap explains a considerable part of work and study stress. Besides that, enhancing individuals' level of PsyCap by a training, reduces some or multiple aspects of stress. This implies that training employees and students to develop more optimistic styles, lower levels of distressed thinking, and more envisioning of the future, helps for example less psychologically resilient employees and students to cope with stress. For educational institutes it would be recommended to implement PsyCap within the academic curriculum. PsyCap may be as - or even more - valuable as a resource for students than the traditional academic knowledge in their future career. A high level of PsyCap helps students persevere in their studies in a healthier manner. This research demonstrated that PsyCap can be developed in short training classroom interventions, which makes it easier to implement.

Furthermore, we would highly recommend organization and the government to focus on the aspects of psychological capital. Employers could organize training sessions to enhance their employees' level of PsyCap, as a resource to persevere when they face stressful events. Besides the fact that employees have their own benefits of a high level of PsyCap, also organizations of these employees experience benefits, for example financial benefits. Previous research paid attention to PsyCap micro-interventions, comparable with the training sessions in the present research. The participants' level of PsyCap in these studies increased on average about 2 percent (Luthans, et al., 2006). This percentage may not seem very large, but a high level of PsyCap is strongly related to more desirable employee attitudes, such as job satisfaction, organizational commitment and well-being at work. Utility analyses demonstrate that the improvement of employees' level of PsyCap could have desirable financial results for the organization. As mentioned earlier in the introduction, Luthans et al. (2007) stated that by

making use of PsyCap training, a mid-sized organization (revenue of 1.5 billion euro) could potentially increase revenues by over 9 million euro per year. The costs of a PsyCap training are relatively small compared to the potential increase in revenues, which makes it more interesting for employers to implement PsyCap training sessions. Next to that, Study 2 found that the students' level of PsyCap could be increased by approximately 8 percent, and employees' level of PsyCap by approximately 6 percent. This finding suggests that the actual revenues for organizations could be even higher than previously calculated.

Besides the possible benefits for employers and educators, the government should pay attention to the benefits of PsyCap as well. The government could set up campaigns to inform people about PsyCap and the possible desirable effects of a higher level of PsyCap. Next to that, prevention is better than cure, so it would be recommended to implement sessions for PsyCap enhancement within the educational curriculum of pupils and students.

The current research supports the statement that PsyCap is a higher-order construct. However, when time or financial resources are limited, it is also possible to train less than four PsyCap constructs. When the main purpose is to enhance the level of PsyCap, based on the findings in this research we recommend to train resilience and self-efficacy. These constructs showed the most improvement after the training. However, when the purpose is to reduce work stress, it is recommended to train the constructs hope and optimism. Those constructs explain more variance in work stress.

Future research

Some suggestions for future research were discussed previously, however more suggestions for future research will be made. First of all, Study 2 measured the effects of the PsyCap training after six weeks, however it would be interesting to examine what the effects

of the PsyCap training are over a longer period, for example a year. More longitudinal research should be conducted to examine the sustainability of the observed effects.

While the current design of Study 2 is well-made, an extra suggestion for future research is to implement an extra treatment group with a random and not scientific based training. The training will not enhance the participants' level of PsyCap, but it pretends it does. Besides the fact that this set up examines pretest sensitization, this design also checks for the placebo effect, suggesting that people improve when they participate in a look-alike treatment.

As mentioned earlier, the four PsyCap constructs, optimism, hope, resilience and self-efficacy, used in this research are not meant to represent an exhaustive list. Other psychological capacities may be considered for inclusion in PsyCap when these psychological capacities are positive characteristics, measureable, state-like or developmental, and related to work performance outcomes (Luthans et al., 2007). The current research only examined the four constructs, because first the effect of training those four constructs and effects on work stress should be established. Because we now know the significant positive impact of training those four PsyCap constructs, future research should examine the impact of other potential PsyCap constructs such as courage or wisdom (Luthans et al., 2007). Furthermore, future research could test whether other outcomes such as retention, performance, job satisfaction and other work-related attitudes can be positively impacted by the training.

Conclusion

This research suggests that enhanced PsyCap is able to reduce some or multiple aspects of individuals' level of work or study stress. Large-scale implementation in organizations and educational institutes will facilitate employees and students to become more optimistic about the future, more hopeful in determining plans and alternative pathways to accomplish goals, more resilient to increasing adversity, and more efficacious in getting the job done. Accordingly, when organizations and educational institutes implement training sessions such as the one tested in this study, they will benefit from the positive effects of PsyCap for stress reduction in today's stress-laden workplace.

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