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Hope, mental health, and competency development in the workplace

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Abstract

Hope is an important motivational psychological resource for performance in various domains such as academics, the workplace, and athletics. This study examined the role of hope and mental health for competency development over 24 months within vocational education and training. A structural equation model based on longitudinal data suggested that vocational competency at the end of training was related to levels of hope three months earlier, even after controlling for vocational competency 24 months earlier. Mid training vocational competency was only marginally related to subsequent levels of hope nine months later. Though hypothesized cross-lagged effects between hope and mental health were not found, the constructs nevertheless related synchronously. Higher vocational competency related positively to mental health nine months later. This study thus suggest, that promoting hope at the workplace will not just strengthen psychological resources, but also positively impact the development of vocational competencies.

Keywords: hope, mental health, competency, workplace, vocational education and training

1. Introduction

As vocational education and training (VET) takes place during important developmental phases (e.g. Arnett, 2000; Sirsch, Dreher, Mayr & Willinger, 2009), it is well positioned to play an important role in fostering personal resources for the entire work life and life in general. Furthermore the megatrends (globalisation, changes in value systems, and the rise of information and communication technologies) are constantly increasing the quality and scope demanded from VET (Achtenhagen & Grubb, 2001), and request the VET to nurture the resources necessary to learn continuously, deal with uncertainty, adapt to changing workplaces, and stay mentally healthy.

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Hope (Snyder, 2000) is such a psychological resource, which helps individuals to deal with hindrances and uncertainty. Hope is also among a small number of constructs, which are related to a well performing (Peterson & Byron, 2008; Reichard, Lopez, Avey, Dollwet & Marques, 2011) and a mentally healthy workforce (Adams et al., 2002; Reichard et al., 2011). The present study is therefore interested in exploring the role hope plays within VET and specifically investigates the relationships of hope in the development of vocational competencies and mental health.

2. Defining hope

Hope is «the process of thinking about one's goals, along with the motivation to move toward those goals (agency), and the ways to achieve those goals (pathways)» (Snyder, 1995, p. 355). As such, hopeful thinking is directed at personally valued goals (Snyder et al., 1991; Snyder, 2002). The progress in goal-attainment is monitored and the resulting emotional feedback regulates behavior and influences the two components of hope: agency and pathways thinking. Rather than an emotion, hope is considered to be a dynamic cognitive motivational system (Snyder et al., 1991). The hope construct of Snyder et al. does not refer to wishful thinking, as in hoping to win the lottery or hoping for good weather. More precisely, hope is the confidence that one will find a way to reach one's goal, although goal attainment is uncertain and difficulties along the way are possible. Hope is closely related, but theoretically and empirically distinctly different from self-efficacy, optimism, resilience, and generalized well-being (Luthans, Avolio, Avey & Norman, 2007; Magaletta & Oliver, 1999; Snyder, 2000). For example, self-efficacy is related to a particular task, context and domain specific (Bandura, 1997), and hope is broader and oriented towards a yet uncertain future. A better idea of how hope relates to similar constructs is given by the characterization of a higher-order construct of psychological capital, which characterizes the interrelations between the variables: «(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, Youssef, & Avolio, 2007, p. 3).

Hope has been linked to numerous positive outcomes at the workplace like employee satisfaction (Adams et al., 2002), commitment (Adams et al., 2002), creativity (Rego, Machado, Leal & Cunha, 2009) and performance (Peterson & Byron 2008; Reichard et al., 2011). Research on psychological capital reveals positive relationships between hope and psychological well-being (Avey, Luthans, Smith & Palmer, 2010), supportive climate, performance (Luthans et al., 2007; Luthans, Avolio, Walumbwa & Li, 2005; Luthans, Norman, Avolio & Avey, 2008), satisfaction (Luthans et al., 2007; Luthans et al., 2008), and commitment (Luthans et al., 2008), and conversely a negative association with absenteeism (Avey, Patera & West, 2006).

3. The development of hope

Hope as trait is viewed as being rather stable over time but still malleable, because individuals learn from their experience and situational feedback can influence these cognitive motivational structures (Snyder, 2002). Peterson and Seligman (2004) included hope in their list of character strengths and define strengths of character as traits, but also claim that they are malleable. Consequently, the current study does not adopt a classical psychometric trait model of personality development (e.g. the five-factor theory of personality; McCrae & Costa, 1999), where traits are viewed as being stable after maturity is reached. A more interactional approach is adopted, where the functioning of the individual is seen as a result of a reciprocal interplay between intrapersonal, behavioral, and environmental influences (e.g. the triadic reciprocal deterministic approach by Bandura, 2008). Personality and work conditions can influence each other over time (Kohn & Schooler, 1983; Frese, Garst & Fay, 2007; Roberts, Caspi & Moffitt, 2003). The present study thus assumes an interaction between environments and individuals' level of hope, which can potentially result in changes of the trait hope over time.

4. Hope and the development of vocational competencies

Hope is a dynamic cognitive motivational system (Snyder et al., 1991), it should be applicable to VET and positively relate to vocational competency development for multiple reasons: First, high hope individuals have strong agency thinking (Snyder, 2000). Hopeful trainees should have a strong belief that goals are attainable. They are more motivated, energized, and persist in the face of hindrances. Secondly, high hope people have strong pathways thinking, which reflects that they generally make out a variety of possible solutions to attain desired goals, and that they are able to develop alternative routes (Snyder, 2000). They expect to apply alternative routes and thus view obstacles as challenges. Consequently, high hope trainees should be more resilient in the face of obstacles at the workplace, and more creative in finding solutions. Thirdly, hope contributes to self-regulation (Snyder, 2002; Wandeler & Bundick, 2011). When framing competency development as a hierarchical structure of ever-smaller sub goals (Hacker, 2003) trainees can be seen as coping with regulation problems in the goal attainment process. The goals in VET range from aims linked to daily work tasks and clearly defined learning goals to the overarching goal of completing a four-year training successfully. Hopeful thinking should play an important role at all levels of goal pursuit. Fourthly, high hope individuals often set more demanding goals, which they strive to achieve (Snyder et al., 2002). Aspiring to more demanding goals during four years of training should result in superior achievement beyond the average competency level. High hope individuals are also more likely to choose learning goals rather than performance goals (Snyder et al., 2002), which should lead to mastery orientation rather than a helpless orientation (Dweck, 1999). Fifthly, high hope employees can cope better with problems and

stressors at work (Peterson & Byron, 2008; Snyder & Feldman, 2000). Therefore hope should help trainees to deal with various sources of stress at the workplace and thus facilitate learning. Finally, the development of expertise occurs through reflexive use of knowledge. Thus attitudes and motivational states of the learners play an important role. Through their positive expectation of future outcomes and their perceived personal agency to influence outcomes, hopeful trainees should be able to learn from reflection and also constructively perceive mistakes as learning opportunities.

Competency development in turn should also have an effect on the level of hope (Wandeler & Bundick, 2011). As individuals expand their action and skill repertoire, they broaden their pathways thinking. Furthermore, experiences of success in VET generate positive emotions and the feedback strengthens motivation and agency thinking. The accumulation of encouraging experiences in a work environment can be generalized to life in general and can eventually lead to a positive core self-belief that the individual is capable of generating pathways and sustaining the energy necessary to pursue and attain goals.

5. Empirical support linking hope and competency

Hope has been linked to competence in academics (Curry, Snyder, Cook, Ruby & Rehm, 1997; Lopez, Reichard, Marques & Dollwet, 2011; Snyder et al., 2002) and athletics (Curry et al., 1997). For example, in a study with adolescents, hope was a significant predictor of grades a year later even after controlling for gender, verbal, and numerical ability (Ciarrochi, Heaven & Davies, 2007). Higher levels of trait hope predicted higher academic achievement (controlled for previous academic achievement) directly and via higher specific expectancies for academic performance (Rand, 2009). In three different U.S. samples of employees of varying job levels and industries more hopeful people were rated a year later as higher performing employees by their supervisors, even after controlling for two established predictors of job performance: self-efficacy and cognitive ability (Peterson & Byron, 2008). Further, when Peterson and Byron confronted management executives with a novel and realistic work-related problem scenario, the more hopeful employees generated more solutions and higher quality solutions. The influence of motivational factors on learning success and competency development has been investigated within training and transfer research, where self-efficacy, which is closely related to hope, has been shown to play an important role in the success of training (Colquitt, LePine & Noe, 2000) and is positively related to learning motivation and learning.

The detailed dynamics of the effects of hope on performance have been theorized about, expanded through individual studies (e.g. Curry et al., 1997; Peterson, Gerhardt & Rode, 2006; Snyder et al., 2002), and summarized in a meta-analysis (Reichard et al., 2011), but the mechanisms through which hope impacts performance still warrant further investigation.

6. Theoretical link between hope and mental health

The mental processes associated with hope contribute to the individual's overall health, result in positive emotions, influence behavior related to primary and secondary prevention, and buffer negative effects in the occurrence of stressors (Snyder & Feldman, 2000; Stajkovic, 2006; Valle, Huebner & Suldo, 2006). Hope can also be viewed as an indicator of adjustment, optimal functioning, and thus mental health. Since mental health is a general indicator of effective human functioning, it would be plausible that mental health is not only caused by hopeful thinking, but also is a precursor and facilitator of hopeful thinking.

7. Empirical findings linking hope and mental health

Hope is associated with mental health, physical health and well-being (Snyder, 2002), satisfaction in life (Park, Peterson & Seligman, 2004), and self-actualization (Sumerlin, 1997). Even after controlling for optimism hope uniquely predicted life satisfaction, positive affect, as well as most components of psychological, and social well-being (Gallagher & Lopez, 2009). Hope also predicted unique variance of well-being after controlling for levels of general self-efficacy and optimism (Magaletta & Oliver, 1999). College students' hope partially mediated the relationship between attachment and mental health (Shorey, Snyder, Yang, & Lewin, 2003).

Ciarrochi et al. (2007) found that adolescents' hope was correlated positively one year later with teacher-rated positive adjustment, and negatively with behavioral and emotional problems. Adolescents reporting higher initial levels of hope were more likely to report higher levels of global life satisfaction a year later, and appeared to be less at risk for experiencing increases in internalizing behavior problems and reductions in life satisfaction when confronted with adverse life events (Valle et al., 2006). Research at the workplace showed that hope is related to psychological well-being (and general mental health of employees (Avey et al., 2010). Hope – as part of positive psychological capital – contributed to changes in both measures of mental health three months later. Avey at al. discuss the results as preliminary evidence that positive psychological resources may over time lead to well-being, but do not address if well-being potentially leads to changes in hope and related variables.

Research gathered thus far provides substantial support for the positive association of hope with indicators of mental health and the negative association with indicators of illness. Hope has been found to predict some amount of change in positive and negative indicators, but the predictive value of hope over longer periods of time and the mechanisms underlying these effects still need to be examined in greater detail.

8. A resource model of hope, mental health and vocational competencies

Hope, mental health, and vocational competencies can be seen as personal resources which help people to deal with stressors at work and sustain increased levels of job

performance. According to the second principle of the conservation of resources theory (Hobfoll, 1998), people with resources can increase and sustain their resources easier than people with fewer resources who struggle to build up further resources and are more vulnerable to enter loss spirals. People with resources can enter gain spirals, where gains in resources lead to further gains (Hobfoll, 1998). Higher levels of hope, higher levels of professional performance and higher levels of mental health are characteristics of healthy functioning persons and are resources that interact with each other positively facilitating further increases and stabilizing each other in case of resource loss or threat thereof.

Vocational competencies are personal resources, that not only provide economic value, but also enhance psychological resources through their influence on identity and other self-related psychological constructs. People's self-evaluation of their professional competencies and performance can constitute an important intrinsic reward bringing them a sense of fulfilment and creating personal incentives for accomplishments (e.g. Bandura, 1997). Work environments promote hope when workers can gain satisfaction in doing tasks well (Snyder & Feldman, 2000). Reaching goals encourages hopeful thinking, as individuals adjust their hopes as they experience success or failure in pursuing goals (Feldman, Rand & Kahle-Wrobleski, 2009). People's affective self-reactions to the development of their competencies, their own performance, their professional pride, and the positive emotional feedback in the process of goal pursuit at the workplace can favorably influence work related emotions, hope and mental health. Positive emotions are not only associated with health, but produce health (Fredrickson, 2001). Experiences of problem solving and overcoming difficulties at work can be generalized to other domains of life and enhance pathways and agency thinking. Competency development and the resulting enhanced performance at the workplace are thus expected to impact hope and mental health positively.

The present study examined a model of reciprocal effects and combined competency measures (from practical exams) with self-reported hope and general mental health over a timeframe of 24 months (see Table 1). In order to differentiate effects of hope from effects solely related to general healthy functioning, the effects of hope were controlled for mental health, and the relation between general mental health and competence was also investigated. Because of the naturalistic design of our study the investigated timepoints were imposed by the schedule of the polymechanical training.

Research Question 1: Relation between Hope and Competency
Based on the theoretical reflections a reciprocal relation between hope and competency is assumed.

Hypothesis 1a: Hope has a positive influence on competency development (performance at final exam controlling for performance at midterm exam).

Hypothesis 1b: Competency level is positively related to later levels of hope.

Table 1: Design of study, different time points of measurement (T1-T4) and sources of data

	T1	T2	T3	T4
Month in study	1	9	21	24
Stage in Training*	Year 2, June	Year 3, March	Year 4, March	Year 4, June
Data source	Survey Wave 1	Survey Wave 1	Survey Wave 2	Registry of state departments for vocational education
Measures	Mid training exam grade	Hope, general mental health	Hope, general mental health	Final exam grade

Note. *Vocational school starts in August and ends in June. Training on the job is year-round.

Research Question 2: Relation between hope and general mental health
In order to the test the hypothesis of reciprocal influence of hope and general mental health, the reciprocal relation is analyzed over a one-year time frame.

Hypothesis 2a: Hope has a positive influence on general mental health.

Hypothesis 2b: General mental health has a positive influence on hope.

Research Question 3: Relation between general mental health and competency
Being mentally healthy should coincide with better adjustment, better functioning, and increased attendance at work, which should also facilitate the development of competencies during vocational training.

Hypothesis 3a: General Mental Health has a positive influence on competency development.

Hypothesis 3b: Competency has a positive influence on general mental health.

9. Method

The data were obtained as part of a larger study founded by the Federal Office for Professional Education and Technology (OPET) in Switzerland. The sample consisted of German speaking Swiss polymechanic apprentices (i.e. they work three to four days a week at mostly private companies and attend vocational schools for the rest of the week). The vocational training to become a polymechanic lasts four years, with exams at the end of the second year and fourth year. The polymechanical profession was chosen because it permitted the recruitment of a large sample and the OPET was interested in research focusing on the manufacturing sector. The present analysis was based on two cohorts of trainees for whom the final grade at the end of

their training was known (N = 318). The trainees had an average age of 19.97 years (SD = 1.20) in the last year of their training, 90.1% were native German speakers and 96.5% male. There were no statistically significant differences associated with gender or native language in the used trainee variables. The selected trainees were in the third or fourth year of the training at the first of two waves of measurement. Since the research interest lied in the development over the years in the vocational training, the data was restructured accordingly and as a result a cohort-sequential design permitted to link the period from the mid training exams to the final exams. Most coefficients are based on both cohorts, except the estimates for the coefficients related to the constructs hope and general mental health in the third year are based on one cohort. The variables used in the model were tested for differences across the cohorts. General mental health, hope and the final grade did not differ statistically significantly. Only for the mid training grade occurred a significant difference ($t(270) = 4.32, p < .001$): the cohort of the first wave had a higher mid training grade ($M = 4.93$, SD = .40) than the cohort of the second wave ($M = 4.71$, SD = .40).

10. Design and Procedure

The data were obtained at four different points in time (see Table 1). The mid training grade resulted from the exams at the end of the 2nd year in June (T1). The measures of hope and general mental health were assessed in March of the 3rd year (T2) and in March of the 4th year (T3). The participating trainees filled out a paper and pencil or an online version of the questionnaire during work hours. No method effect was found. The final exam took place in June of the 4th year (T4).

Hope: A previously tested German version of the Adult Dispositional Hope Scale (Snyder et al., 1991) was used. The participants answered the eight items of the hope scale on a 6-point Likert-type scale ranging from 1 (definitely false) to 6 (definitely true). The overarching hope construct consists of two highly correlated subscales with four items each: pathways or ways (example: «Even when others get discouraged, I know I can find a way to solve the problem.») and agency or will (example: «I energetically pursue my goals.»). Snyder et al. (2002) report Cronbach's α ranging from .74 to .78 across multiple independent samples (Snyder et al., 1991). In the present study, the internal consistency for the dispositional Hope Scale was satisfactory (α year 3 = .74, α year 4 = .78). For the present study the overarching hope construct was considered; differential effects of pathways and agency were not hypothesized.

General mental health: A german previously validated version of the General Health Questionnaire (GHQ-12) was used to assess general mental health (Goldberg, 1972). A sample item is: «Have you recently been able to enjoy your normal day-to-day activities?» Items were scored on a 4-point Likert scale using anchors that originally ranged from 1 (better than usual) to 4 (much worse than usual). In order to make the interpretation of the scale more intuitive, the coding was reversed, so that high values correspond to better mental health. Some items loaded very low

on the general mental health factor. To estimate the latent factor of general mental health only 4 items with high lambda values and no indication for correlated errors were retained. The reliability of these four items was satisfactory (α year 3 = .79, α year 4 = .80).

Competency measures: A long tradition exists within dual vocational training systems to test vocational skills and knowledge with complex work tasks (Breuer, 2006). During the polymechanical training the mid training exams at the end of the second year (T1) and the final exams at end of the fourth year (T4) are important assessments of practical vocational competencies, as well as professional and general knowledge. The mid training exam tests the mastery of basic skills and the subject matter of the first two years. The final exam tests the overall proficiency as a professional, and determines if the individual is granted the professional certification. Both exams therefore have a high external validity. The grades range from 1 (very poor) to 6 (very good). Grades below 4 (satisfactory) are the unsatisfactory grades, and will not be sufficient to obtain the professional certification. For both exams the total grade was used as competency indicator. The final examinations take place at the vocational schools with experts evaluating the trainees' practical performance. The exams at the state level are supposed to reflect the same vocational competencies based on the federal curriculum and guidelines. There was no significant difference in mean levels of the grades due to states. Consequently, no variance of the final exam was associated with the states, and for the mid training grade about 2.5% of the variance was associated with the state level. Both grades were collected from the records of the states' vocational training departments. The officially reported mid training grade and the self-reported mid training grade correlated with $r = .97$. The self-reported measures were thus highly trustworthy and because the self-reported grades were more prevalent, the self-reported data were used as indicators for the mid training grade. The final grades were only based on information from state departments for vocational training, since the final exam took place three months after the last survey.

11. Missing Data

In longitudinal modeling, missing data from a subject can be partially missing at a particular wave of assessment or all the items from a particular wave could be missing. The analysis reported in this study uses the full information maximum likelihood procedure to deal with missing data (Enders & Bandalos, 2002). Model parameters and standard errors are estimated directly from the available data. Missing data points are not estimated or imputed, and are essentially treated as values that were never intended to be sampled. Schafer and Graham (2002) report that for large enough samples ($N > 250$), maximum likelihood estimation and the multiple imputation methods are very similar and equally effective.

12. Statistical Analyses

In order to examine the reciprocal effects among hope, general mental health, and competency, an autoregressive cross-lagged models was specified. Because each construct is autocorrelated, the magnitude of the cross-lagged coefficients indicates how much variation in Variable A at T1 predicts aggregate change in Variable B at T2 or vice versa. One can thus see the cross-lagged paths as the influence of the constructs of interest on each other. Although autoregressive cross-lagged models are widely used, the statistical assumptions underlying these models have been subject to criticism (Rogosa, 1995). One critique is that autoregressive models assume fixed effects for all individual units under investigation and reflects group changes only. Another critique asserts that these models do not account for absolute changes in individual scores for a construct of interest. Going beyond the research questions of the present article, for the analysis of individual differences in processes of change, latent growth curve structural equation models or autoregressive latent trajectory models could be specified (Bollen & Curran, 2004). The structural equation model was estimated using AMOS 6.0 (Arbuckle, 2005). The model includes the latent constructs hope and general mental health in the 3rd and 4th year of training. The indicators for competency were the grades at the end of the second year and at the end of the fourth year. When a flexible view of personality is adopted, temporal instability can reflect either true psychological change or measurement error (Watson, 2004). The measurement model was explicitly modeled to correct the latent constructs for measurement error.

Measurement model. Hope and general mental health were treated as latent factors with four indicators for general mental health and four parcels for hope. The eight indicators for hope were reduced to four parcels, in order to obtain a more parsimonious model, because the structural paths between latent variables were of more interest than the measurement model and the individual items (Little, Cunningham, Shahar & Widaman, 2002). Although hope is used as a construct with a single dimension, the method of Kishton and Widaman (1994) was followed to balance out the agency and pathways components. Following this approach, for each parcel, an item from the agency and pathways component was randomly chosen. The marker variable method has been used to identify the model. That is, for each construct, one randomly-selected factor loading was set to one. In all models the measurement errors of the same indicators at different measurement waves were allowed to covary (Little, Preacher, Selig & Card, 2007). The primary criterion for panel models is that they demonstrate weak factorial invariance, the fundamental meaning of the constructs is stable over time and respective indicators represent the same construct over time (i.e. the structure of the models and relative loadings of the factors do not differ) (Little et al., 2007). To test for weak factorial invariance, the factor structure of all the constructs was specified in the same way for the two waves. This model was then compared to a model with equality constraints of the factor loadings of the same indicator across time. The overall fit of the model with the factor loadings set equal

for the constructs across time points was satisfactory ($\chi^2 = 144.56$, $df = 124$, $p = .10$, $\chi^2/df = 1.17$, $RMSEA = .02$, $CFI = .98$, $TLI = .98$) and did not fit the data significantly worse (χ^2-difference = 1.73, $df = 6$, $p = .94$) than the model with free factor loadings for the constructs across the two time points ($\chi^2 = 142.84$, $df = 118$, $p = .06$, $\chi^2/df = 1.21$, $RMSEA = .03$, $CFI = .98$, $TLI = .97$), thus fulfilling the most basic prerequisite for longitudinal modeling (Little et al., 2007).

13. Results

Means, standard deviations and correlations

The means, standard deviations and correlations for the manifest variables hope, general mental health, the mid training grade and the final grade are documented in Table 2. All the constructs were clearly above their theoretical midpoints. Hope and general mental health remained at similar levels with a minimal declining tendency. The mid training and final grade had the same mean, slightly below the grade of 5 (good).

Table 2: Means, standard deviations and correlations of the manifest variables hope, general mental health (GHQ), mid training grade, and final grade

	Variable	N	M	SD	1	2	3	4	5
1	Hope Year 3 (T2)	103	4.81	0.50					
2	Hope Year 4 (T3)	314	4.75	0.58	0.55**				
3	GHQ Year 3 (T2)	102	3.34	0.56	0.33**	0.19			
4	GHQ Year 4 (T3)	316	3.30	0.58	0.11	0.24***	0.20*		
5	Mid training Grade (T1)	301	4.80	0.42	0.05	0.05	0.15	0.12*	
6	Final Grade (T4)	318	4.80	0.35	0.11***	0.20***	0.21*	0.19***	0.69***

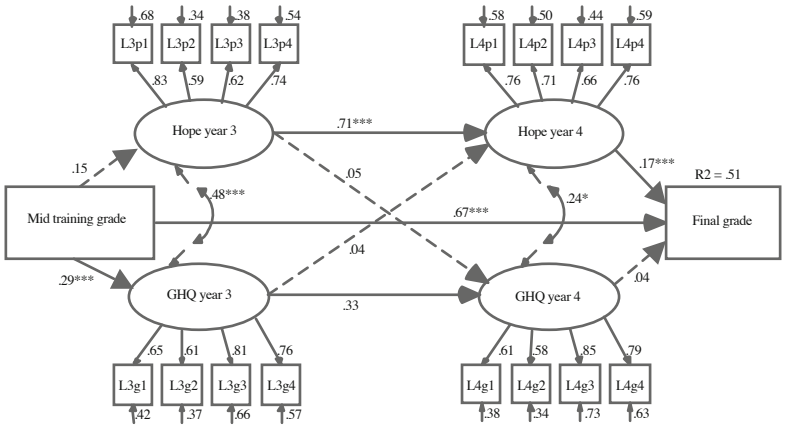
Note: * $p < .05$. ** $p < .01$. *** $p < .001$

Stability of hope and general mental health

After the examination of the measurement models (see Method section), the structural paths were modeled (see Figure 1). First, an autoregressive path was introduced between the measurements of hope at Time 1 and Time 2 in order to account for the temporal stability of hope over time. The corresponding path was also introduced for general mental health. Autoregressive paths are generally seen to represent how stable a construct is from one time point to the next, because they indicate the degree to which the individuals' relative rank order changes (e.g. Finkel, 1995). They are thus referred to as stability coefficients. As mentioned earlier, the stability coefficients do not bear information about individual change in absolute scores across different

points in time. Additionally, the residuals of corresponding indicators were allowed to correlate across measurements to account for variations due to disturbances specific to the item (Little et al., 2007). Hope in year 3 predicted hope in year 4 with $\beta = .71$ ($p < .001$), indicating a rather high stability in rank order over one year. On the other hand general mental health in year 3 predicted general mental health in year 4 with $\beta = .33$ ($p < .05$), indicating that the rank order in general mental health changed more than the rank order in hope. General mental health was thus a lot less stable over the investigated timeframe than hope.

Figure 1: Latent autoregressive cross-lagged model for hope, general mental health (GHQ), mid training grade, and final grade.



Note: All regressions coefficients are standardized. Bold paths represent statistically significant coefficients. Dotted paths indicate modelled, but non-significant coefficients. Double headed arrows represent correlations between residuals. Measurement errors of corresponding indicators were allowed to correlate freely over time, but are not displayed in the figure. Factor loadings of respective indicators were set equal across both time points. * p < .05. ** p < .01. *** p < .001.

Research Question 1: Relation between Hope and Competence

The final grade was well predicted ($\beta = .67$, $p < .001$) by prior competency level (mid training grade). After controlling for this prior level of competency, hope in year 4 (about three months before the final exams) was also a statistically significant predictor ($\beta = .17$, $p < .001$) of the final grade. The 49% of the variation in the final grade explained simply by prior achievement was increased to 51% by adding hope to the predictors. Hope as a unique predictor explained 7% of the variation in final grade. Thus hypothesis 1a, which claimed that hope was a predictor of the competency level at the end of training, was supported. The hypothesized positive effect of performance on hope (hypothesis 1b) could not be clearly supported over this 9

month period, because the path from the mid training grade to hope in year 3 was only marginally statistically significant ($\beta = .15, p = .07$).

Research Question 2: Relation between Hope and General Mental Health

In order to reflect the reciprocal influences of hope and general mental health two cross-lagged paths were introduced (see Figure 1). These cross-lagged coefficients informed about the structural relationships between the two constructs. Because the influence of prior time points of the same construct were accounted for by the autoregressive paths, the cross-lagged effects indicated the separate influence of the other construct and were aimed at explaining changes in the other construct. The cross-lagged effects were not significantly different from zero. Thus, hope and general mental health did not predict change in each other and the hypotheses 2a and 2b could not be supported. The residuals of the constructs were allowed to correlate in order to reflect variation not accounted for by variables from earlier time points. The correlation in year 3 ($r = .48$, $p < .001$) indicated a substantial synchronous relation, which was about half the size in year 4 ($r = .24$, $p < .05$).

Research Question 3: Effects of Performance on Hope and General Mental Health

General mental health was not a statistically significant predictor of the competency level at the end of training. Hence, the effect of mental health on performance (hypothesis 3a) was not supported. However, the mid training grade was a statistically significant predictor of general mental health nine months later ($\beta = .29, p < .001$), thus supporting hypothesis 3b.

Discussion

The longitudinal data permitted the present study to investigate how hope, mental health and vocational competency interrelate over time within the context of vocational training. The empirical results only partially supported the hypothesized resource model.

The influence of hope on the final grade at the end of the vocational training highlighted the impact hope can have on competency development in VET, especially since the effect on the final level of competency was controlled for the level of competency attained at the middle of training. The finding thus confirms the effect of hope on academic achievement (Curry et al., 1997; Reichard et al., 2011) and performance at the workplace (Peterson & Byron, 2008; Reichard et al., 2011).

Hope theory clearly states that hope is nurtured by experiences of successful goal pursuit (Feldman, Rand, & Kahle-Wrobleski, 2009; Snyder, 2002). It was therefore surprising that the positive effects of the mid training grade on hope were only of marginal statistical significance. Since individuals constantly received new feedback in regard to their numerous goal pursuits the effects of the performance at exams

could have worn off after the substantial time lag of nine months. Investigations with shorter timeframes and multiple measurements should be able to clarify how strong short-term feedback effects from vocational competence on hope levels are.

The hypothesized positive reciprocal relationships between hope and mental health were not confirmed over a twelve months time lag. However, the considerable synchronous relationships between hope and general mental health could be a sign that reciprocal effects between hope and mental health potentially take place within shorter timeframes. Shorter intervals of measurement with the inclusion of state hope measures would give clearer indications of the temporal dynamic of the effects. For example, Avey et al. (2010) had found small but significant predictions in change of the GHQ by Psychological Capital over a shorter period of three months.

The significant positive relation of the performance at the mid training exams with mental health nine months later is an indicator for the importance of performance and development of vocational competencies at the workplace for the general mental health of vocational trainees. However, the present design did not allow for interfering causal relations and the underlying mechanisms are likely more complex. One possibility is a third variable influencing both performance as well as mental health. For example, socioeconomic background is a variable associated with mental health and academic performance (e.g. Costello, Compton, Keeler, & Angold, 2003). Because the hypothesis, that mental health is related to latter performance, could not be supported, it seems more likely that mental health is a result of performance rather than a cause for it.

Strengths, Limitations and Future Research

The length of the investigated timeframe and the multiple measurement waves made the investigation of longitudinal effects beyond the limitations of cross-sectional data possible (i.e. questions of directionality and reciprocity). However, since the analysis is based on an accelerated or cohort-sequential design (the hope and mental health scores at T3 were not available for one cohort) potential problems of this method also apply to the present analysis (e.g. the combination of the information obtained from the two cohorts could be problematic, if the two cohorts would be substantially different in variables for which we were not able to examine non-difference). Although longitudinal cross-lagged models have a considerably stronger position to make causal arguments than models based on cross-sectional data, they do not have the strength of experimental data. Key threats to causal inferences include the exogeneity assumption, the omitted variable problem, and potential confounding of instrumental variables (Little et al., 2007). The true causal agent could be due to events antecedent to the study. Similarly, omitted variables could be the true causal agents leading to covariation giving the appearance of causality. For example, it is likely that the initial level of hope upon entering the training influences latter levels of hope, mental health, and achievement. In order to shed more light on the specific nature of the reciprocal effects, future studies should consider adopting

a similar time horizon, but with more measurement waves in order to narrow down effects and explore the processes and dynamics of hopeful thinking. Besides investigating trait hope, future research would possibly benefit from the inclusion of state hope to capture the more short-term dynamics of reciprocal effects with performance and mental health. Feedback from performances could have short-term effects (e.g. several weeks) on state hope and more lasting effects on hope in general. An additional strength of the longitudinal data is the availability of information about competency levels at different time points during the training, which permits to narrow down the effects of hope more precisely.

When using hope as a construct to predict performance a potential fallacy of circular reasoning, which is rarely mentioned, should be considered. Potentially problematic is a conceptual and measurement issue: some of the hope items for the agency component focus on prior successes (e.g. I've been pretty successful in life; I meet the goals that I set for myself). Predicting performance with hope could thus be viewed as using a self-reported holistic evaluation of prior performance as indicator to predict present or future performance. This problem however is diminished by the considerable broadening of the meaning of the construct hope through other agency and pathways items.

The large, real-world sample suggests a strong ecological validity. However, the sample is limited to mostly male Swiss German-speaking polymechanic trainees. Replication of the results within another profession, other age group and with more female participants would further support the generality of the underlying psychological processes.

Conclusion

In the introduction we suggested, that VET should, besides developing vocational competencies, also foster personal resources and mental health to prepare trainees for future workplace demands. The proposed resource model, where hope, mental health and vocational competencies are interacting personal resources could only be partially supported. This study provided initial theoretical and empirical support for the hypothesis that hope is an important personal psychological resource for the development of vocational competency during VET. Even after controlling for the vocational competency level at mid training and mental health three months before the final exams, trainees' hope can have a positive effect on the attained competency level at the end of the training. Consequently, the present study would advise organizations to specifically foster hope as a character strength. By doing so the organizations would not only strengthen the trainees' resources to deal with future challenges during their work life, but ultimately also promote mental health, because of the positive effect of vocational competency on mental health.

Although the positive impact of vocational competencies on hope could only be marginally supported over the investigated nine month timeframe, the considerable theoretical argument still makes it plausible to assume that VET can have a positive

impact on trainees' general hope with its core business of developing vocational competencies. Organizations can consider enhancing hope with targeted interventions (e.g. Lopez, Rose, Robinson, Marques, & Pais Reibero, 2009; Lopez et al., 2004) or by creating a hope fostering learning environment and organizational culture (Wandeler, Baeriswyl, & Shavelson, in press).

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