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Combining teaching with another job: a possible resource to face professional challenges. Preliminary findings from a Swiss study in vocational education and training

Viviana Sappa¹, Elena Boldrini^{1*} and Carmela Aprea²

*Correspondence:
elena.boldrini@iuffp-svizzera.ch

¹ Swiss Federal Institute
for Vocational Education
and Training, Via Besso 84,
6900 Lugano, Switzerland
Full list of author information
is available at the end of the
article

Abstract

Background: There is a general consensus regarding the stressful nature of the teaching profession and an extensive body of literature has shown a multitude of risks and protective factors that influence teachers' professional well-being. In this framework, a growing interest has been observed in the research dealing with the effects of combining teaching with another job (multiple job-holding) on teachers' professional well-being. However, the literature investigating the relationship between multiple job-holding and professional well-being is quite heterogeneous and related findings are still inconsistent. Thus, the need for further investigation to clarify the psychological and behavioural consequences of multiple job-holding for teachers emerges. The present study will contribute to meeting this need by exploring the possible protective role of combining teaching with another job in a large sample of Swiss vocational education and training (VET) teachers in Canton of Ticino.

Methods: Data on perceived threatening factors and professional well-being were collected from 602 VET teachers using an online questionnaire. A one-way ANOVA test was employed to investigate the effect of multiple job-holding on perceived threatening factors and professional well-being. A multiple group path analysis was performed to examine the moderating effect of multiple job-holding on the relationship between threatening factors and professional well-being.

Results: The findings showed that combining teaching with another job has an indirect impact on teachers' professional well-being by reducing their perceived exposure to threatening factors and related stress. Moreover, multiple job-holding helps moderate the negative effects of school-related challenges as well as the difficulties in balancing work and other activities on professional well-being.

Conclusions: The study reinforced the positive interpretation of multiple job-holding as a possible resource for teachers at both the instructional and personal levels. The added value of this condition should be taken into greater consideration at the policy and school levels through the creation of favourable conditions for teachers who are interested in and available to experience additional jobs outside school walls. However, further investigation is needed to better understand the positive impact of combining teaching with another job, particularly in relation to specific jobs' structural characteristics and individuals' biographical situations.

Keywords: Multiple job-holding, Vocational education and training, Teachers' well-being, Multiple group path analysis, Risk factors, Protective factors, Professional challenges

Background

There is a general consensus regarding the stressful nature of the teaching profession, which can expose teachers to a progressive loss of motivation, satisfaction and sense of competence, even to the extent of burn-out (Howard and Johnson 2004; Gu and Day 2007; Richardson et al. 2013; Spilt et al. 2011). In this field, extensive literature has shown a multitude of risk and protective factors that influence professional well-being through dynamic interactions (for a review, see Beltman et al. 2011). In particular, some scholars have questioned the possible beneficial or detrimental effects of combining teaching with another job (i.e. multiple job-holding) and a growing interest has been seen in the behavioural and psychological consequences of multiple job-holding for employees and particularly for teachers. The relevance of investigating this topic is supported by the following.

First, the rate of people who combine multiple jobs is progressively increasing in various European (Simic and Sethi 2002) and non-European countries (Kimmel and Smith Conway 2001; Sliter and Boyd 2014). Moreover, many such people are school teachers (Stinson 1997; Simic and Sethi 2002). In Switzerland, the rate of multiple job-holders is gradually growing, increasing from 4 % in 1994 to 7.4 % in 2009 (Bundesamt für Statistik 2010). The multiple job-holding condition is especially favoured among Swiss vocational education and training (VET) teachers, who are required to have prior careers in their specific teaching fields. To satisfy this requirement, most become teachers after spending several years as employers or tradesmen and some keep their previous jobs in addition to their teaching jobs (see also Hof et al. 2011). In addition, the Swiss VET system has a strong apprenticeship tradition, founded on a “dual” structure that combines theoretical classes at school with practical experience at the workplace. In such a context, simultaneous experience as both a teacher and a professional in the taught field may be encouraged and valued as an advantage. Against this background, the increasing use of multiple-job contracts has stimulated a growing interest in investigating the possible effects of such a condition for individuals and organisations (Sliter and Boyd 2014).

Second, although multiple job-holders were originally defined as people who combined primary full-time jobs with secondary part-time jobs for economic reasons—so-called moonlighters (Wilensky 1963)—recent surveys have shown a more heterogeneous picture. A growing number of multiple job-holders combine two or more part-time jobs (Guest et al. 2006) as a consequence of the widespread use of non-standard contracts in the current labour market. Moreover, in many cases, the choice to combine two or more jobs is driven by an individual preference for independence and a self-managed career, as in the case of portfolio workers who “contract their skills and knowledge to various individuals and organisations, in effect creating a ‘portfolio’ of work activity for themselves” (Fenwick 2006, p. 66). On the basis of those considerations, many scholars have argued the need for a better understanding of the different impacts that such a variety of multiple job-holding situations has on individuals' attitudes and behaviours at work (Guest et al. 2006; Sliter and Boyd 2014; Zickar et al. 2004).

Third, as shown by Guest and colleagues (Guest et al. 2006), the past research exploring the effects of multiple job-holding are quite heterogeneous, and related findings are still inconsistent. In particular, the terminologies and constructs used to describe the combining of multiple jobs are varied, including moonlighting (Wilensky 1963), portfolio working (Fenwick 2006), free working (Knell 2000) and boundary-less careers (Arthur 1994). Moreover, two main hypotheses have been adopted to interpret the phenomenon of combining multiple jobs. The first consists of the traditional and negative view, which involves a person seeking a second job because of the constraints of his or her first job (i.e. the deprivation hypothesis). According to this perspective, some scholars underscore the potential negative impacts of multiple job-holding on individuals, including its possible detrimental effects to job satisfaction, quality of life and performance in the workplace (Parham and Gordon 2011; Arcuri et al. 1987; Maninger et al. 2011). By contrast, the second hypothesis emphasises the positive impacts of multiple job-holding on individuals' well-being. For example, Jamal et al. (1998) showed that Canadian teachers who combined teaching with another job reported less burn-out and stress, lower intentions to quit their primary jobs as teachers and higher job performance. The authors interpreted these findings within the framework of the "energetic/opportunity" hypothesis by describing multiple job-holders as individuals who draw psychological and professional advantages—in terms of both personal satisfaction and professional development—from being involved in a variety of professional contexts. An additional inconsistent contribution comes from those studies which support and demonstrate a lack of difference in the job satisfaction of people who hold multiple jobs and those engaged in single jobs (Pearson et al. 1994; Guest et al. 2006). Finally, a number of scholars have questioned the quality and the characteristics of the jobs multiple job-holders are involved in. In particular, Zickar and colleagues (2004) reported the "role conflict" hypothesis, according to which if the primary and secondary jobs are very dissimilar, an employee is more likely to face role conflicts and feel less satisfaction, since more effort is required to shift among the different roles and to adapt roles and behaviours to the different jobs' demands. In addition, Sliter and Boyd (2014) stressed the need to consider the motivation for multiple job-holding when examining its possible effect on professional well-being. Individuals forced to hold multiple jobs due to financial reasons may, for instance, experience greater negative consequences than people who voluntarily choose to have multiple jobs.

The consequences of combining multiple jobs were also questioned in an explorative and preliminary interview study we conducted in Canton of Ticino on VET teachers' well-being (Sappa et al. 2015a). The findings of this study showed that the combining teaching with another job—especially if said job related to the subject taught at school—was perceived by the teachers as a factor supporting their well-being. Particularly, the supportive role of combining teaching with another profession was described by the interviewees as existing at three levels.

First, at the emotional level, combining teaching with another job seemed to support teachers in "stepping back" from situations encountered at school, modulating the perceived seriousness of such situations and keeping problems in perspective. In addition, being engaged in different professional activities was described as a source of strength and a way to remain continuously stimulated by different inputs.

Second, at the cognitive level, combining teaching with another job seems to support teachers in using different perspectives to analyse problems by improving their flexibility and their capacity to use alternative strategies to cope with problems. In addition, some interviewees declared that being engaged in different jobs had empowered their organisational skills, making them even more capable of combining and balancing different activities.

Third, at the instructional level, various advantages were associated with the opportunity to combine teaching with another job, especially if that job was in the same field. Interviewees declared that extra-school experiences in their field gave them stronger credibility in front of the students. They were able to offer students more opportunities to connect the subject matter with the real world of work, thus reducing the risk of the students' losing sight of its applicability in the world "outside the school walls".

These findings, in addition to the past literature, encouraged us to investigate in more detail the possible association between multiple job-holding and professional well-being among Swiss VET teachers.

Methods

Aim and research questions

The present study is part of a larger quali-quantitative study aiming at investigating resilience and well-being among Swiss VET teachers (Sappa et al. 2013, 2015b).

The aim of this study was to investigate whether and how combining teaching with another job could help teachers maintain their professional well-being, despite facing challenges.

In particular, the following research questions were addressed:

1. Does combining teaching with another job contribute to reducing teachers' perceived exposure to threatening factors?
2. Does combining teaching with another job contribute to reducing teachers' perceived stress related to professional threatening factors?
3. Does combining teaching with another job contribute to fostering professional well-being in terms of job satisfaction, work engagement, sense of competence as a teacher and sense of confidence in facing professional challenges?
4. Does combining teaching with another job moderate the association between threatening factors and the variables of professional well-being?

Sample and procedure of data collection

The data used in this study were collected in April 2014 via a questionnaire, which was anonymously and electronically submitted to the entire VET teacher population in the Canton of Ticino, an Italian-speaking part of Switzerland. A total of 602 individuals (a 40 % response rate) filled out the questionnaire. Among the participants, 43.6 % were female, and the average age was 30 years old (*sd* 8.6). Various career phases were represented. In fact, among the involved teachers, 31.5 % were in the early phase of their career (1–7 years of teaching in VET schools), 29.6 % were in the middle phase (8–15 years in VET schools), 32.5 % were in the middle-late phase (16–30 years in VET schools) and 6.6 % were in the late phase (over 30 years of teaching in VET schools).

Finally, both part-time teachers and full-time teachers were included into the sample. In particular, the distribution of working-time percentages in teaching (based on contract) was the following: 11.3 % of the participants were employed with working-time percentage contracts corresponding to less than 30 %; 12.3 % of the sample were employed with working-time percentage contracts corresponding to 30–49 %; 27.1 % of the involved teachers were employed with working-time percentage contracts corresponding to 50–79 and 49.3 % of the respondents were employed with full-time contracts corresponding to working-time percentage of 80–100 %.

Measures

The questionnaire was developed based on the qualitative findings of a preliminary interview study we conducted on Swiss VET teachers (Sappa et al., 2013). The questionnaire included the following four sections: (a) perceived threatening factors, (b) perceived resources, (c) perceived well-being and (d) socio-demographic and professional biographic data. All data were self-reported. Three sets of variables were used in this study (see Table 1), as follows:

- a) *Perceived threatening factors* A list of 19 threatening factors, grouped into six scales and two single items, was considered here in terms of both *exposure* (i.e. frequency) and *perceived stress*. Exposure was investigated by asking each respondent how often he or she faced each of the threatening situations (using a 5-point scale from 1, or “never”, to 5, or “always”). Perceived stress was explored by asking about the extent to which each factor was perceived as a source of stress by the respondent (from 1, or “not at all”, to 4, or “very much”). The four scales reported threatening factors related to (a) challenges at the macro-system level (4 items; e.g. perceptions of low social recognition), (b) difficulties in balancing work and other activities (3 items; e.g. difficulties in reaching a work–life balance), (c) school-related challenges (3 items; e.g. experiences of conflicts with colleagues), (d) classroom-related challenges (4 items; e.g. experiences with challenging students) and e) role-related challenges (3 items; e.g. feelings of being pressed by an excessive sense of duty). The two single items referred to (f) perceived exposure to curricula reforms and (g) perceived difficulty adapting a subject’s content to students’ professional profiles. The multi-dimensional structure of the perceived threatening factors considered here was supported by a factor analysis.¹ In addition, all the scales showed acceptable internal consistency (Cronbach’s alphas ranged from 0.62 to 0.86).
- b) *Professional well-being* In this study, we investigated professional well-being by considering the following components: job satisfaction, work engagement, sense of competence as a teacher and sense of confidence in facing professional challenges. Four single-item scales were adopted to analyse the four aspects of well-being. Specifically, participants were asked to rate the extent to which they agreed with the four state-

¹ Various factor solutions were tested by means of an explorative factor analysis, which was computed separately for items relating to frequency and perceived stress. The best solutions were selected on the basis of theoretical reasons (i.e. the meaningfulness of each factor) and empirical reasons (i.e. explained variance, loading factors). A principal component analysis was applied with an Oblimin rotation. The final solution showed the same five factors in both sets of items. Two items were excluded from the analysis because of their high correlations with more than one factor. These items were considered separately. The five-factor solutions showed 63.4 and 69.7 % explained variance for frequency and perceived stress items, respectively.

Table 1 Description of the variables included in the study

Variables	Item/sample items	Item response range	N items	Alpha
<i>Perceived exposure to threatening factors</i> How often have you faced the following challenges?				
Challenges at the macro-system level	Perceiving low social recognition	1 (never)—5 (always)	4	.78
Difficulties in balancing work and other activities	Difficulties achieving work–life balance	1 (never)—5 (always)	3	.62
School-related challenges	Facing conflicts with colleagues	1 (never)—5 (always)	3	.73
Classroom-related challenges	Facing challenging students	1 (never)—5 (always)	4	.82
Role-related challenges	Feeling an excessive sense of professional duty	1 (never)—5 (always)	3	.72
Exposure to curricula reforms	Feeling pressured by curricula reforms	1 (never)—5 (always)	1	–
Difficulty adapting subjects to students' professional profiles	Feeling like it is difficult to adapt subjects to students' professional profiles	1 (never)—5 (always)	1	–
<i>Perceived stress related to threatening factors</i> To what extent have each of the following challenges been a source of stress for you?				
Challenges at the macro-system level	Perceiving low social recognition	1 (not at all)—4 (very much)	4	.79
Difficulties in balancing work and other activities	Difficulties achieving work–life balance	1 (not at all)—4 (very much)	3	.67
School-related challenges	Facing conflicts with colleagues	1 (not at all)—4 (very much)	3	.86
Classroom-related challenges	Facing challenging students	1 (not at all)—4 (very much)	4	.85
Role-related challenges	Feeling an excessive sense of professional duty	1 (not at all)—4 (very much)	3	.78
Exposure to curricula reforms	Feeling pressured by curricula reforms	1 (not at all)—4 (very much)	1	–
Difficulty adapting subjects to students' professional profiles	Feeling like it is difficult to adapt subjects to students' professional profiles	1 (not at all)—4 (very much)	1	–
<i>Professional well-being</i> To what extent do you agree with the following statements?				
Job satisfaction	At the moment, I feel satisfied with my job	1 (extremely disagree)—7 (totally agree)	1	–
Work engagement	At the moment, I feel engaged in my job	1 (extremely disagree)—7 (totally agree)	1	–
Sense of competence as a teacher	At the moment, I feel competent as a teacher	1 (extremely disagree)—7 (totally agree)	1	–
Confidence in facing professional challenges	At the moment, I feel able to face professional challenges	1 (extremely disagree)—7 (totally agree)	1	–
<i>Current professional status</i>				
Combining teaching with other jobs	Are you involved in another job in addition to teaching?	a. No, I am not involved in any other jobs b. Yes, in a field close to my teaching c. Yes, in a completely different field	1	–

ments with regard to job satisfaction, work engagement, competence as teachers and confidence in facing professional challenges. Items were rated on a 7-point scale ranging from “extremely disagree” to “totally agree”.

- c) *Current professional status* Participants were asked to select from among three job conditions, including (a) only a teacher (i.e. a teacher who does not combine teach-

ing with any other job), (b) a multiple job-holder in similar fields (i.e. a teacher who combines teaching activities with another job similar to the field being taught, such as a teacher in accounting who works as an accountant) and (c) a multiple job-holder in heterogeneous fields (i.e. a teacher who combines teaching with another job in a completely different field with respect to the subject(s) taught). Three groups were created on the basis of the respondents' answers.

Procedure of data analysis

Descriptive statistics were first applied to develop a general picture of the three investigated groups (i.e. only teachers, multiple job-holders in similar fields and multiple job-holders in heterogeneous fields) with respect to gender, teaching experience and age. In addition, the association between multiple job-holding and working-time percentage in teaching was considered. In Switzerland part-time contracts are highly diffused, and variegated working-time percentages for employees exist, ranging from 5 to 10 % to 100 %. In the Canton of Ticino, full-time VET teaching (100 % working-time percentage) implies about 40 working hours per week, including 25 h to be spent teaching in the classroom.

A one-way ANOVA was used to examine the associations among professional status, threatening factors and variables of professional well-being. Specifically, we tested whether significant variations occurred across the three professional status groups with respect to the following variables: (a) perceived exposure to threatening factors (research question 1), (b) perceived stress related to such factors (research question 2) and (c) variables of professional well-being (research question 3). The LSD post hoc test was applied, and the statistical significance was set at $p < 0.05$.

The fourth research question was addressed by employing a multiple group path analysis using Mplus7 (Muthén and Muthén 2013).

We first developed a model representing the effects of threatening factors on the variables of professional well-being. In so doing, we applied structural equation modelling in a model generating (rather than a model testing) approach (see Jöreskog 1993). Using this perspective, we defined an initial model by considering the direct effect of each threatening factor on each professional well-being variable. Subsequently, several modifications were made to the model in order to improve its fit by deleting parameters that were not significant and by distinguishing (on the basis of theoretical rationales) direct and indirect effects. The final model was selected based on model fit statistics, including the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the Root Mean Square Error of Approximation (RMSA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI) and the Standardised Root Mean Square Residual (SRMR), as suggested by Hu and Bentler (1999). The final model was then used as a baseline model to test for the moderating effect of combining teaching with another job on the impact of perceived exposure to threatening factors on variables of professional well-being.

Thus, a multiple group path analysis was performed to examine whether statistically significant differences in structural parameters occurred across the two groups of people: people who were only teaching and people who combined teaching with another

job. A Wald test for the equality of regression coefficients was adopted using the Model Test option in Mplus.

Results

General description of people who combine teaching with another job

Seventy per cent of the sample (426 people) were employed only as teachers, 16 per cent (93 people) combined teaching with another job in a completely different field with respect to the teaching subject and the remaining 14 per cent (85 participants) combined teaching with another job similar to the taught field. Therefore, the total rate of multiple job-holders in our sample was 30 %—a significantly higher value than the 7.4 % shown in national statistics from 2009. Although further data are needed, we might interpret the difference in percentages as evidence that VET teachers are especially involved in multiple job-holdings in comparison with other employees.

Slightly significant associations were found between professional status and gender and teaching experience (see Additional file 1: Tables S6, S7). Particularly, multiple job-holders were, in our sample predominantly male and beginning teachers. Moreover, people in the late phase of their careers were more likely to be only teachers—or, alternatively, to be involved in an additional job that is very different from the taught field. There was a high association between professional status and working-time percentage. As could have been expected, people who only teach were mostly employed with full time contracts. However, the sub-sample of multiple job-holders appeared to be more balanced in terms of working-time percentage (see Additional file 1: Table S8). People who combine teaching with another job were, in fact, equally distributed across the different working-time percentages. Finally, no associations were found between multiple job-holding and age (see Additional file 1: Table S9).

Effects of combining teaching with another job on perceived exposure to threatening factors, related stress and variables of professional well-being

The means and standard deviations of perceived threatening factors and well-being related to each group are presented in Table 2. Taken as a whole, the findings showed a moderate level of exposure to threatening factors across the three groups, as well as a moderate level of perceived stress related to each of these factors. Moreover, high levels of job satisfaction, work engagement, sense of competence as a teacher and sense of confidence in facing professional challenges were revealed. On one hand, these findings are consistent with what has been shown by various national and international surveys with regard to high job satisfaction and well-being among Swiss workers (see, for example, Sousa-Poza and Sousa-Poza 2000). On the other hand, the means and standard deviations of the threatening factors also revealed that Swiss teachers are not immune to experiencing challenging and stressful professional situations and that variations with regard to such experiences do occur among the participants (see also Kucera and Stauffer 2003).

With regard to the details of the group comparisons, the one-way ANOVA showed a significant association between professional status and perceived threatening factors. In particular, people who combined teaching with another job perceived challenges to be less frequent and less stressful than colleagues who worked only as teachers. For nearly

Table 2 Perceived exposure to threatening factors, perceived stress and professional well-being by professional status. mean comparison (One-way ANOVA)

	Response range	Total	Only teacher	Multiple job-holder in heterogeneous fields	Multiple job-holder in similar fields	F	P	R ²
Perceived exposure to threatening factors								
Challenges at the macro-system level	1–5	2.57 (0.85)	2.65a (0.83)	2.3b (0.89)	2.44b (0.86)	7.635	0.001	0.025
Difficulties balancing work and other activities	1–5	2.54 (0.80)	2.61a (0.82)	2.39b (0.80)	2.39b (0.69)	4.683	0.010	0.015
School-related challenges	1–5	2.14 (0.89)	2.21a (0.87)	2b (0.99)	1.96b (0.83)	4.109	0.017	0.014
Classroom-related challenges	1–5	2.42 (0.60)	2.46a (0.59)	2.33ab (0.68)	2.27b (0.58)	4.534	0.011	0.015
Role-related challenges	1–5	2.55 (0.74)	2.64a (0.72)	2.24b (0.77)	2.45c (0.71)	12.593	<0.001	0.040
Exposure to curricula reforms	1–5	2.79(1.11)	2.94a (1.07)	2.32b(1.17)	2.52b(1.08)	15.283	<0.001	0.048
Difficulty adapting subjects to students' professional profiles	1–5	2.14 (0.96)	2.25a (0.94)	1.86b(1)	1.92b (0.90)	9.294	<0.001	0.030
Perceived stress related to threatening factors								
Challenges at the macro-system level	1–4	1.91 (0.68)	1.97a (0.68)	1.76b (0.70)	1.77b (0.63)	5.483	0.004	0.018
Difficulties balancing work and other activities	1–4	2.23 (0.72)	2.30a (0.74)	2.10b (0.68)	2.10b (0.64)	5.943	0.003	0.019
School-related challenges	1–4	2.11 (0.92)	2.19a (0.91)	1.97b (0.93)	1.90b (0.89)	4.761	0.009	0.016
Classroom-related challenges	1–4	2.25 (0.72)	2.32a (0.71)	2.1b (0.75)	2.10b (0.69)	5.700	0.004	0.019
Role-related challenges	1–4	2.19 (0.69)	2.25a (0.68)	1.99b (0.73)	2.15ab (0.66)	5.626	0.004	0.018
Exposure to curricula reforms	1–4	2.32 (0.94)	2.44a (0.93)	1.99b (0.95)	2.07b (0.85)	12.241	<0.001	0.039

Table 2 continued

	Response range	Total	Only teacher	Multiple job-holder in heterogeneous fields	Multiple job-holder in similar fields	F	P	R ²
Difficulty adapting subjects to students' professional profiles	1–4	1.86 (0.79)	1.92a (0.77)	1.72b (0.85)	1.71b (0.78)	4.265	0.014	0.014
Professional well-being								
Job satisfaction	1–7	4.71(1.7)	5.67(1.3)	5.86(1.9)	5.99(1.1)	2.685	0.069	0.009
Work engagement	1–7	5.75(1.25)	5.86(1.2)	5.84(1.2)	6.11 (0.91)	1.623	.198	0.005
Sense of competence as a teacher	1–7	5.9(1.18)	6.06b (0.79)	5.8a (0.95)	6.07b (0.87)	4.074	0.017	0.013
Confidence in facing professional challenges	1–7	6.02 (0.83)	5.96 (0.99)	5.97(1)	6.16 (0.87)	1.635	0.196	0.005

Different letters indicate significant mean difference at $p < 0.05$

LSD post hoc test

all the variables, no differences were found between the two sub-groups of people who combined teaching with another job (i.e. those who were involved in a job closely related to the taught field and those who were engaged in a job very different from the taught field). These groups differed only with respect to the perceived role-related challenges. Teachers who combined teaching with jobs different from the taught field perceived such challenges to be less frequent and less stressful than those colleagues who only taught or whose additional job was related to the taught field.

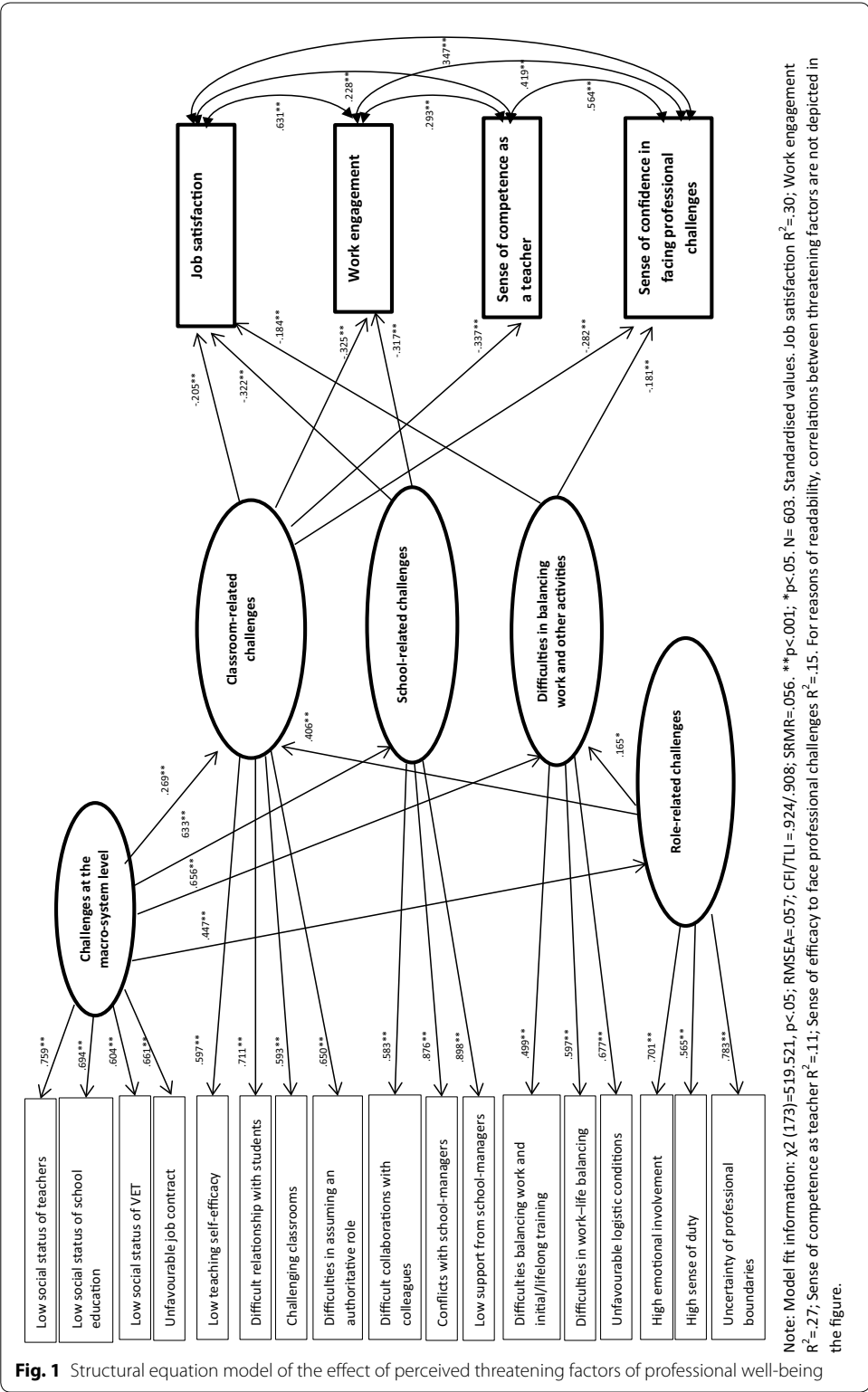
In contrast, no association was found between professional status and variables of professional well-being, except with regard to the sense of competence as a teacher, which was lower for those who combined teaching with another job in a field that was very different from the taught subject.

Association between threatening factors and variables of professional well-being

Structural Equation Modelling (SEM) techniques were employed using the MPlus software package to investigate the effect of threatening factors on variables of professional well-being. The tested model entailed a measurement part and a structural part. In the measurement part of the model, the scales of perceived exposure to threatening factors were tested by means of a Confirmative Factor Analysis (CFA). In the structural part of the model, the relationship between perceived exposure to threatening factors and variables of professional well-being were investigated through a path analysis.²

Adopting a model generative approach (Jöreskog, 1993), an initial model was designed and tested by considering the direct effects of all the threatening factors on all the variables of professional well-being. However, the model did not fit the data well ($\chi^2(191) = 875.845$, RMSEA = 0.077; CFT/TLI = 0.862/0.818; SRMR = 0.121). Thus, as suggested by Jöreskog, several modifications were conducted on the basis of empirical and theoretical-logical rationales. As a consequence, the two single variables were excluded from the model because of their lack of significant effects on all the variables of professional well-being. Likewise, the paths of association between latent factors and variables of professional well-being that resulted in non-significance were removed from the model. Finally, we found that both challenges at the macro-system level and role-related challenges did not show any direct significant effects on the professional well-being variables. However, medium-high values of correlations ($0.451 < r < 0.730$) were found particularly between challenges at the macro-system level and all other threatening factors, as well as between role-related challenges and classroom-related challenges and difficulties in balancing work and other activities. We then decided to explore the possible indirect effects of challenges at the macro-system level and role-related challenges on professional well-being, instead of simply excluding those factors from the model. From a theoretical point of view, we think it is reasonable to consider challenges at the macro-system level and role-related challenges to be allocated at a different

² Considering the high association we found between professional status and working-time percentage, a preliminary analysis was performed to test whether working-time percentage correlates significantly and differently in the two groups of “only teachers” and “multiple job-holders” with respect to the two sets of variables included into the model (i.e. perceived exposure to threatening factors and professional well-being variables). Very low correlations were shown in both groups. Particularly, correlation values ranged from $r = 0.012$ to $r = 0.267$. Those findings suggest that working-time percentage has a similar low impact in the two sub-groups, on both perceived exposure to threatening factors and professional well-being. On the basis of this consideration, we decided not to include job percentage in teaching into our model.



structural level in comparison to the other threatening factors. In particular, on the one hand, challenges at the macro-system level refer to the more general and distal conditions under which teachers carry out their work (see also the model of ecological system

of Bronfenbrenner 1979). On the other hand, we think role-related challenges may be reasonably considered as something in between the macro and the micro levels of professional experiences. Role-related challenges refers, in fact, to the perceived role expectations as well as to the personal ways of meeting such expectations by the individuals. Those aspects encompass the teachers' conceptions and beliefs of what constitutes his/her duties and tasks in order to do a good job. Adopting a constructivist approach, expectations, conceptions and beliefs do contribute to defining the subjective framework under which individuals interpret and approach their everyday experience (see, for example, Farrell and Lim 2005; Marton et al. 2004). Moreover, as shown by many cross-cultural studies, subjective expectations, conceptions and beliefs can be influenced by cultural and social structural aspects (see, for example, Khine et al. 2010), such as the macro-system threatening factors here investigated.

The modifications mentioned above improved considerably the model. The Chi square value decreased significantly ($\Delta\chi^2 = 356.324$; $\Delta df = 18$, $p < 0.001$), and goodness of fit indices reach satisfactory values ($\chi^2(173) = 519.521$, RMSEA = 0.057; CFT/TLI = 0.924/0.908; SRMR = 0.056).³

A closer look at the resulting model (Fig. 1) showed the following interactions. Challenges concerning teaching and relationships with students (school-related challenges) negatively impacted all investigated aspects of professional well-being. Additionally, difficult relationships with colleagues and/or the school principal (school-related challenges) significantly reduced job satisfaction and work engagement. Perceived difficulties in work-life balancing (difficulties in balancing work and other activities) significantly threatened job satisfaction and sense of confidence in facing professional challenges. A perception of not being adequately supported at the macro-system level (challenges at the macro-system level) significantly increased exposure to all other types of challenges, while role expectations and beliefs (role-related challenges) amplified classroom-related critical situations and challenges in balancing work with other activities.⁴

On one hand, the structural modelling results confirm the significant role of this multitude of factors in threatening teachers' professional well-being (Gu and Day 2007; Beltman et al. 2011). On the other hand, the model contributes to differentiating among the effects of the different factors by distinguishing direct and indirect impacts and by determining the effects of the different components of professional well-being considered here. We will discuss the association between perceived threatening challenges and professional well-being in detail in a further paper; here, however, we seek primarily to explore the moderating effect of teachers' current professional status.

The moderating effect of combining teaching with another job on the association between threatening factors and variables of professional well-being

The structural model described above is considered the baseline model for investigating the moderating effect of current professional status on the association between

³ On the basis of the mentioned indices, we accepted the model, despite a significant Chi square value ($\chi^2(173) = 519.521$, $p < 0.05$). In fact, for models with 400 cases or more, the Chi square is almost always statistically significant (Kenny 2014). Thus, in such cases, other goodness-of-fit indexes are recommended.

⁴ The effects shown in the model remain significant when also controlling by gender and teaching experiences (data not shown). Considering the scarce impact those variables had on both perceived threatening factors and professional well-being, we decided to exclude them from the baseline model. This choice was also due to the need to make the model more parsimonious.

Table 3 Standardised factor loading and standard error of the baseline CFA model for both groups together (whole sample) and for separate groups

Latent factors/indicators	Standardised factor loading and standard error for both groups together	Standardised factor loading and standard error by group	
	Whole sample	Only teachers	Multiple job-holders
Challenges at the macro-system level			
Low social status of teachers	0.775 (0.024)	0.770 (0.029)	0.771 (0.045)
Low social status of school education	0.712 (0.026)	0.711 (0.031)	0.684 (0.052)
Low social status of VET	0.607 (0.031)	0.617 (0.036)	0.560 (0.060)
Unfavourable job contract	0.653 (0.029)	0.625 (0.037)	0.721 (0.049)
Classroom-related challenges			
Low teaching self-efficacy	0.598 (0.033)	0.626 (0.041)	0.497 (0.069)
Difficult relationships with students	0.708 (0.029)	0.689 (0.038)	0.697 (0.054)
Challenging classroom	0.585 (0.034)	0.566 (0.043)	0.677 (0.055)
Difficulty assuming an authoritative role	0.640 (0.032)	0.612 (0.042)	0.723 (0.053)
School-related challenges			
Difficult collaborations with colleagues	0.585 (0.030)	0.549 (0.037)	0.638 (0.050)
Conflicts with school managers	0.878 (0.015)	0.877 (0.020)	0.886 (0.025)
Low support from school managers	0.896 (0.014)	0.891 (0.020)	0.899 (0.024)
Difficulties in balancing work and other activities			
Difficulties balancing work and initial/lifelong learning	0.479 (0.041)	0.492 (0.051)	0.499 (0.070)
Difficulties achieving work–life balance	0.582 (0.038)	0.617 (0.048)	0.524 (0.073)
Unfavourable logistic conditions	0.697 (0.033)	0.698 (0.044)	0.598 (0.064)
Role-related challenges			
High emotional involvement	0.703 (0.030)	0.693 (0.040)	0.690 (0.055)
High sense of duty	0.569 (0.035)	0.516 (0.045)	0.617 (0.061)
Uncertainty of professional boundaries	0.779 (0.029)	0.786 (0.039)	0.778 (0.052)

perceived threatening factors and variables of professional well-being. A multiple group path analysis was employed for this investigation. For statistical reasons, we merged the two groups of people who combined teaching with another job (i.e. those who combined it with a job similar to the taught field and those who combined teaching with a job in a very different field). The minimal differences between these two groups shown by the one-way ANOVA test in terms of perceived threatening factors and variables of professional well-being gave us an additional reason to join them into a single group. Therefore, the structural paths were tested in relation to the following two groups: a) participants who worked only as teachers (i.e. only teachers) and b) participants who combined teaching with other jobs (i.e. multiple job-holders).

A preliminary analysis was employed to test for measurement invariance across the two groups—that is, the test analysed whether the investigated measures (i.e. latent factors) had the same meaning for each group. For this analysis, we examined the measurement part of the model, which consisted of the CFA adopted to test for the structure of the scales. Following the guidelines proposed by Dimitrov (2010), we first analysed the

configural invariance by testing the CFA baseline model separately for the two groups. Afterwards, we assessed the metric invariance (which implies equal factor loadings across groups) and the scalar invariance (which implies both equal factor loadings and equal indicator intercepts across groups). The goodness of fit indexes of the CFA baseline model indicated an acceptable fit for each group (only teachers: $\chi^2(109) = 288.163$, RMSEA = 0.062; CFT/TLI = 0.918/0.898; SRMR = 0.057; multiple job-holders: $\chi^2(109) = 204.949$, RMSEA = 0.070; CFT/TLI = 0.910/0.888; SRMR = 0.062). The details of the factor loadings are provided in Table 3.

On the basis of these findings, we can assume the configural invariance for the CFA model across the two groups of teachers. A shortcut procedure was adopted to simultaneously run and compare the Chi squares for configural, metrical and scalar invariance. The findings showed (see Table 4) that the Chi square difference between the metric model and the configural model was not statistically significant ($\Delta\chi^2(5) = 17.484$, $p > 0.05$), thus indicating a metric invariance across the two groups. However, the Chi square difference between the scalar model and the configural model was statistically significant ($\Delta\chi^2(5) = 70.983$, $p < 0.05$), indicating that there was no scalar invariance across the two groups. When only metric invariance is shown, we can say that a weak measurement invariance is provided; under this condition, the relationship between the latent factors and the external variable can be compared across groups, while a factor means comparison is not possible (Dimitrov 2010). However, our aim was limited to investigating the moderating effects of teachers' professional status on the relationship

Table 4 Measurement invariance across the two groups (only teachers and multiple job-holders)

Models compared	$\Delta\chi^2$	Df	P
Metric against configural	17.484	12	0.132
Scalar against configural	70.983	29	<0.05
Scalar against metric	53.499	17	<0.05

Table 5 Standardised path coefficients, significantly differentiated through combining teaching with another job—unconstrained model

Specific path	Teaching only			Combining teaching with another job			Wald test Chi square value	P
	Standardised estimate	SE	p	Standardised estimate	SE	p		
School-related challenges → Job satisfaction	-0.385	0.045	$P < 0.001$	-0.121	0.089	n.s.	12.856	<0.001
School-related challenges → Work engagement	-0.306	0.050	$P < 0.001$	-0.200	0.068	.003	8.257	0.004
Difficulties balancing work and other activities → Confidence in facing professional challenges	-0.240	0.050	$P < 0.001$	0.019	0.076	n.s.	12.230	<0.001

Model fit information: $\chi^2(173) = 519.521$, $p < 0.05$; RMSEA = 0.057; CFI/TLI = 0.924/0.908; SRMR = 0.056. ** $p < 0.001$;

* $p < 0.05$. N = 603. Unstandardised values. Job satisfaction $R^2 = 0.30$; Work engagement $R^2 = 0.27$; Sense of competence as teacher $R^2 = 0.11$; Sense of efficacy to face professional challenges $R^2 = 0.15$. For reasons of readability, correlations between threatening factors are not depicted in the figure

between perceived threatening factors (i.e. latent factors) and variables of professional well-being (i.e. external variables). Thus, we can consider the weak measurement invariance to be a sufficient condition (see Dimitrov 2010; Millsap 2012).

A further step of this analysis consisted of testing for structural invariance—that is, we assessed whether the baseline structural model was valid across the two groups. Constraining all structural parameters to be equal across the groups resulted in an acceptable overall model fit. Although the fit was not perfect, the RMSEA met the satisfactory criterion of 0.08, the CFI and TLI approached the criterion value of 0.09 and the SRMR was lower than 0.08. On the basis of these findings, the structural paths (as a whole) could be considered valid for both groups.

Finally, we tested the differences among groups with respect to each of the paths included in the model. A Wald test was employed to test for the equality of regression coefficients, and we conducted a separate Wald test for each structural path of the model. Three paths were found to differ significantly across the groups (see Table 5). Particularly, current professional status was found to moderate the relationships among school-related challenges, job satisfaction and work engagement, such that the negative effect was weaker for people who combined teaching with another job than for those who worked only as teachers. Moreover, combining teaching with another job seemed to reduce the negative effects of perceived difficulties in balancing work and other activities on people's sense of confidence in facing professional challenges.

Discussion

In this paper, we aimed to investigate the possible protective role of combining teaching with another job in a sample of Swiss VET school teachers. In particular, on the basis of the preliminary qualitative findings, we were interested in examining whether the opportunity to combine teaching with another job contributed to

- a. reducing the teachers' perceived exposure to threatening factors (research question 1);
- b. reducing the teachers' perceived stress related to such factors (research question 2);
- c. fostering professional well-being in terms of job satisfaction, work engagement, sense of competence as a teacher and sense of confidence in facing professional challenges (research question 3) and
- d. moderating the relationships among threatening factors and variables of professional well-being (research question 4).

In reference to the first two research questions, we found that people who combined teaching with another job experienced threatening situations less frequently and perceived these situations to be less stressful. Moreover, very few differences were found with regard to job similarity. In particular, individuals who combined teaching with a secondary job in a completely different field experienced role-related challenges to be less frequent and less stressful than colleagues who held secondary jobs that were close to the taught field. These findings do not support the “role conflict” hypothesis of Zickar and colleagues (2004)—according to which if the primary and secondary jobs are very dissimilar, an employee is more likely to face role conflicts. On the contrary, we posit

that being engaged in two dissimilar jobs might help individuals “take a step back” from problems encountered at school, as well as reduce their identity investments as teachers. The flip side of the coin is the negative effect such conditions may have on teachers’ sense of competence. Indeed, people who combine teaching with another job in a very different field reported the lowest levels of perceived competence as a teachers. In other words, although being involved in dissimilar jobs may support teachers emotionally, such dissimilarity might reduce individuals’ opportunities to reinforce the specific competences required for their two separate job fields. In consequence, teaching-specific knowledge and skill development may be reduced in favour of more heterogeneous competence profiles.

With regard to the third research question, no direct relationship was found between combining teaching with another job and the components of professional well-being investigated here. As described above, the only exception existed in the case of perceived sense of competence as a teacher, which was significantly lower for respondents who held secondary jobs that were very different with respect to the subject taught.

In response to the last research questions, our findings revealed that combining teaching with another job moderated the relationships among school-related challenges, job satisfaction and work engagement. More specifically, the job satisfaction and work engagement of those who combined teaching with another job appeared to be less negatively influenced by school-related challenges. In addition, combining teaching with another job reduced the negative impact of perceived difficulties in balancing work and other activities on respondents’ sense of confidence in facing professional challenges. Thus, the opportunity of experiencing different professional roles and contexts may reduce not only the exposure and perceived stress related to professional challenges encountered, but also the negative impact of such challenges on professional well-being.

In sum, the findings showed that combining teaching with another job has an indirect impact on teachers’ professional well-being by reducing their perceived exposure to threatening factors and related stress. Moreover, combining teaching with another job was found to help moderate the negative effects of school-related challenges and difficulties in balancing work and other activities on various components of professional well-being.

In the next paragraph, we will discuss the indirect association found between combining teaching with another job and professional well-being in the context of the literature on multiple job-holding. Afterwards, we will discuss possible mechanisms beyond the protective role of combining teaching with another job.

The association between multiple job-holding and professional well-being

As mentioned in the introduction of this paper, the previous literature has shown inconsistent findings concerning the possible risk or protective roles of multiple job-holding on individuals’ job satisfaction and well-being (Guest et al. 2006). Some scholars (Parham and Gordon 2011; Arcuri et al. 1987; Maninger et al. 2011) have argued that multiple job-holders experience greater risks in terms of psychological well-being and that they are less engaged in their primary job than single job-holders are. In contrast, other studies have shown that multiple job-holders report lower burn-out and turnover intentions (Jamal et al. 1998). Finally, several researchers have found no differences between

multiple job-holders and single job-holders with respect to professional satisfaction or well-being (Pearson et al. 1994; Guest et al. 2006). The results of the present study indicate that combining teaching with another job has a primarily indirect effect on professional well-being. In particular, no difference was found between multiple job-holders and single job-holders in terms of job satisfaction, work engagement or a sense of confidence in facing professional challenges. Additionally, only a slight difference was found with respect to the two groups' senses of competence as a teacher. These findings support those authors (Jamal et al. 1998; Guest et al. 2006; Pearson et al. 1994) who disagree with the "deprivation-constrains hypothesis", according to which being involved in multiple jobs negatively impacts individuals' quality of work life. Moreover, teachers who combined teaching with other jobs reported less exposure to professional challenges and perceived these challenges as less stressful. Although our data did not inform us of the degree of burn-out of the participants, we can assume that the lower stress related to perceived challenges will be associated with lower risk of burning out. Furthermore, the moderating effect of combining teaching with another job on the association between professional challenges and certain variables of job well-being offers further evidence of the protective (albeit indirect) role of multiple job-holding. In sum, our findings support a positive view of multiple job-holding, particularly with regard to its contribution to reducing perceived challenges and stress rather than to reinforcing professional well-being.

Possible mechanisms beyond the protective role of combining teaching with another job

The findings from our preliminary interview study (see the background section of this manuscript) suggested various ideas for interpreting the protective role of multiple job-holding, which was shown in the questionnaire study illustrated in this paper.

First, the protective role of combining teaching with another job may result from the fact that being involved in a job besides teaching may encourage teachers to view teaching challenges in a different light by reducing the negative emotional impact of such challenges and by modulating the perceived seriousness of problems. In other words, multiple job-holding might help teachers assume a more relativistic perspective of their problems by facilitating a comparison among different professional domains and by evaluating—in a more critical way—the nature of their problems. In addition, this protective role could be contributed to "taking a step back" from a problematic situation by favouring an emotional recovery. The emotionally supportive role of multiple job-holding was supported by Sliter and Boyd (2014), particularly in cases in which one's additional job is very satisfactory, is a source of mastery for the individual and is a consequence of a free choice. We have no information about the nature of our participants' additional jobs, and we also do not know the motives that pushed them to take on a secondary job. However, by considering the satisfactory salary condition of Swiss teachers—at least those employed through full-time contracts—we can assume that multiple job-holding was a voluntary choice for most of the teachers in our sample. Consequently, it is plausible to assume that the participants' secondary jobs would have been left if they were not perceived to be somehow satisfactory. Further studies are, nevertheless, needed to clarify these possibilities.

Secondly, the hypothesis that combining a multitude of job activities can empower teachers in their organisational abilities seems to be supported by the following results: (a) teachers who combined teaching with another job reported fewer difficulties in balancing work and other activities and perceived such challenges to be less stressful, and (b) difficulties in balancing work and other activities had less negative impacts on participants' perceived abilities to face professional challenges when the participants held multiple jobs (in comparison with participants who worked only as teachers). However, these results require further investigation, especially with regard to gender differences and differences in family status. In particular, we can consider these findings to be the consequence of a "self-selection" effect. It may be that people who become engaged in multiple jobs tend to be people with fewer parental and family demands and who are originally favoured with regard to combining various activities. Further analysis is needed to better understand this issue.

Furthermore, the interview findings suggested that combining professional experiences inside and outside school can support teachers in reinforcing their abilities to teach in more "connective-oriented" ways—that is, to more effectively connect school learning and workplace practices. This hypothesis may contribute to explaining differences between multiple job-holders and single job-holders with respect to their perceived difficulty in adapting subject teaching to students' professional profiles, as well as with respect to their perceived classroom-related challenges. In our sample, teachers who combined teaching with other jobs reported both lower exposure to challenges and more minimal related stress. These findings are particularly relevant in VET schools, where the question of how to improve the school–workplace connection still constitutes a critical challenge (Hardy and Parent 2003; Akkerman and Bakker 2012; Fuller and Unwin 2011; Sappa and Aprea 2014). As suggested by the teachers we interviewed in the first phase of our study, the opportunity to teach what they practiced every day as professionals gave them the chance to not only anchor their teaching in authentic examples, but to also gain credibility in front of their students. In this regard, both instructional and relational effects were stimulated. In addition, being engaged in a job outside "the walls of the school" can maintain teachers' contact with the world of work and with society in general, independently of students' specific professional fields. Assuming double or multiple professional identities inside and outside school can improve teachers' potential to act as brokers capable of introducing elements of the world of work into the schools (and vice versa) (Akkerman and Bakker 2012; Wenger 1999). This process can consequently facilitate students in learning across the boundaries of school and the workplace, as well as to improve their school-related motivation.

Conclusion

The present study shows indirect protective effects of combining teaching with another job on professional well-being. More specifically, combining teaching with another job may reduce teachers' exposure to threatening factors, decrease teachers' perceptions of such factors as a source of stress and partially moderate the effects of such factors on various variables of professional well-being.

However, a number of limitations should be considered when examining the results of this study, as follows:

First, the degree of variance explained by the models tested in this study is quite low. Thus, many other factors should be considered. On the basis of the previous literature, in future studies, we will particularly explore the additional contributions of part-time vs. full-time employment contracts and teachers' motives for holding secondary jobs. Specifically, exposure to threatening factors and professional well-being could be reasonably influenced by the number of hours individuals spend in teaching, independently from whether or not they hold a second job. On the one hand, the high association we found between professional status (only teachers vs. multiple job-holders) and working-time percentage makes it hard to distinguish between the possible independent effects of the two variables on professional well-being. On the other hand, the fact that, independently from professional status, a low correlation was found between work-time percentage and perceived exposure to threatening factors and professional well-being, which supports us in considering a specific and independent effect of multiple job-holding on professional well-being. However, more advanced investigations are needed to clarify the possible interaction between multiple job-holding and time spent in the different jobs with respect to professional well-being. Further analysis might also explore more in depth the contributions of gender, family status and teaching career phases.

Second, we found a weak measure of invariance across groups with respect to the threatening factor scales used in this study. Thus, further analysis is needed to validate our measures of perceived threatening factors.

Third, the current study relies on cross-sectional self-reported data, thereby reducing our capacity to test for causal relationships among variables. From this perspective, although the explorative use of regression and mediation analysis with cross-sectional data as a preliminary step of more time-consuming and expansive longitudinal designs is largely diffused (Baron and Kenny 1986; Gelfand et al. 2009; Harris 2008; MacKinnon et al. 2007; Maccallum and Austin 2000; Maxwell et al. 2011), we are aware that further longitudinal analyses are needed to properly investigate the causal relationship between threatening factors and professional well-being, as well as the mediation effects included in the model.

Last, but not least, professional well-being should be better conceptualised and investigated. Although some scholars have demonstrated the validity of using single-item scales to analyse various components of well-being, including job satisfaction (Dolbier et al. 2005; Nagy 2002) and self-efficacy (Hoepfner et al. 2011), we aim to introduce standardised scales capable of more systematically exploring job satisfaction, work engagement and a sense of competence. In addition, collective well-being should be considered. Indeed, the literature has shown that combining teaching with another job might reduce teachers' availability to participate in school meetings, as well as their availability to engage in additional school activities with colleagues (Maninger et al. 2011; Parham and Gordon 2011). Consequently, colleagues and principals might perceive multiple job-holding as a problem. This perspective should be considered in further studies.

Despite these limitations, we believe that this study has various practical implications, as follows:

First, our findings reinforce the positive view of multiple job-holding and provide evidence of the relevance of supporting teachers who express an intention of or interest in combining teaching with another job. The positive implications of combining teaching

with other jobs has been shown at both the instructional and personal levels, and the added value of such a situation should be taken into greater consideration at the policy and school levels. However, we are far from considering multiple job-holding as the optimal condition for everyone in every context and every phase of one's teaching career. In particular, we agree with those scholars who emphasise that the positive effects of multiple job-holding depend on the voluntary choice to engage in such a condition. From this perspective, on one hand, we consider it important to create institutional conditions that encourage teachers to experience jobs outside the "walls of the school"—even for a restricted period or a restricted number of hours. On the other hand, however, we point out the need to interpret the added value of such an experience in relation to the each teacher's particular career and personal biography.

Furthermore, it is relevant to consider the processes beyond the positive effects of combining teaching with another job in order to find alternative or additional ways to promote such processes. For example, the emotional and cognitive processes associated with involvement in different jobs may be alternatively stimulated through the encouragement of exchanges between teachers and other professionals, as well as through involving teachers in different kinds of activities that include collaborations or interactions with the world outside the school. Another possibility could be for teachers to diversify their activities within the school context.

Finally, at the research level, we believe that the effects of combining teaching with another job on professional well-being are worth further investigation. With respect to our research, we aim to conduct additional analysis testing related to the effects of combining teaching with other jobs on perceived resources, as well as in relation to additional structural variables, such as voluntariness, gender and teaching experience. Additionally, we will replicate the analysis in subsequent questionnaire studies by including more standardised measures of professional well-being and by expanding the sample to include other Swiss linguistic regions.

Additional file

Additional file 1. Appendix. Association between Current Professional Status and Gender, Teaching Experience, Working-Time Percentage as Teacher and Age

Authors' contributions

VS, participated in the design of the study and in the data collection. She performed the statistical analysis, interpreted the data and draft the manuscript. EB, participated in the design of the study and in the data collection. She contributed to the data analysis and interpretation. She revised the manuscript. CA conceived, designed and coordinated the study. She advised on statistical analysis and interpretation of the data. Se revised the manuscript. All authors read and approved the final manuscript.

Author details

¹ Swiss Federal Institute for Vocational Education and Training, Via Besso 84, 6900 Lugano, Switzerland. ² Lehrstuhl für Wirtschaftspädagogik, Wirtschaftswissenschaftliche Fakultät, Friedrich-Schiller-Universität Jena, Carl-Zeiß-Straße 3, R 4.141, 07743 Jena, Germany.

Competing interests

The authors declare that they have no competing interests.

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