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Is burnout separable from depression in cluster analysis?
A longitudinal study

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Abstract

Purpose Whether burnout and depression represent distinct pathologies is unclear. The aim of this study was to examine whether burnout and depressive symptoms manifest themselves separately from each other or are so closely intertwined as to reflect the same phenomenon.

Methods A two-wave longitudinal study involving 627 French schoolteachers (73 % female) was conducted. Burnout was assessed with the Maslach Burnout Inventory and depression with the 9-item depression module of the Patient Health Questionnaire.

Results Burnout and depressive symptoms clustered both at baseline and follow-up. Cluster membership at time 1 (T1) predicted cases of burnout and depression at time 2 (T2), controlling for gender, age, length of employment, lifetime history of depression, and antidepressant intake. Changes in burnout and depressive symptoms from T1 to T2 were found to overlap. Teachers with increasing burnout experienced increases in depression and teachers with decreasing burnout experienced decreases in depression. In addition, emotional exhaustion, the core of burnout, was more strongly associated with depression than with depersonalization, the second dimension of burnout, underlining an inconsistency in the conceptualization of the burnout syndrome.

Conclusions Our results are consistent with recent findings showing qualitative and quantitative symptom overlap of burnout with depression. The close interconnection of burnout and depression questions the relevance of a nosological distinction between the two entities. Emotional exhaustion and depersonalization, the two main dimensions of burnout, may be better conceptualized as depressive responses to adverse occupational environments than as components of a separate entity.

Keywords Burnout · Cluster analysis · Depression · Longitudinal study · Nosological overlap

Introduction

The term "burnout" refers to a syndrome resulting from chronic occupational stress that combines two main characteristics, emotional exhaustion (loss of energy and feeling of helplessness) and depersonalization (loss of motivation and withdrawal) [1–3]. Depression has been causally related to both acute and chronic stress and is characterized by anhedonia (inability to experience pleasure) and depressed mood [4–8]. Burnout and depression are currently considered major foci in occupational health research [9]. However, the distinctiveness of burnout with respect to depression remains an object of debate [10–15].

Although burnout and depression have been differentiated in the past [16], for instance in factor analyses [17], and viewed as clinically and nosologically distinct [13, 18], the two entities show notable similarities. A recent study [10] by Bianchi and his colleagues (2013) suggests that burned out workers can exhibit the full array of depressive symptoms [4], including the most extreme (e.g., suicidal ideation). In addition, job stress, which is assumed to play a key role in the etiology of burnout [16], has been involved in the etiology of depression as well [8, 19–23]. Importantly, in the

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original interviews that gave birth to the burnout construct [16], the presence of depression has not been investigated in a systematic way, raising the possibility that the distinction between burnout and depression is artificial. Following this line of reasoning, burnout symptoms may be manifestations of a depressive syndrome rather than of a separate entity.

Most (longitudinal) studies that focused on the burnout–depression relationship [1, 24–26] were designed to determine whether burnout predicted depression or the other way round, based on the premise that burnout and depression are distinguishable. Such studies, thus, endorsed the burnout–depression distinction rather than tested it. To date, there is a paucity of research on the *coexistence* of burnout and depressive symptoms in working individuals.

The aim of this two-wave longitudinal study was to examine whether burnout and depressive symptoms are separable from each other or intertwined and reflective of a single phenomenon. First, we focused on how burnout and depressive symptoms clustered at baseline and follow-up. Second, we examined whether the course of burnout and depressive symptoms from time 1 (T1) to time 2 (T2) overlapped. Third, we assessed the extent to which cluster membership at T1 predicted cases of burnout and depression at T2. On the basis of recent findings suggesting that the burnout–depression overlap has been underestimated [10, 11], we hypothesized that burnout and depressive symptoms would cluster in workers. Because the use of the burnout label may mask the actual prevalence of depression in the workplace and undermine clinicians' ability to prevent, diagnose, and treat depression, it is important that burnout's nosological status and clinical picture be clarified [27, 28].

Materials and methods

Participants and data collection

A survey accompanied by an introductory cover letter was emailed to several thousand elementary, middle, and high schools in France during the year 2012 (April–June and November–December periods). The cover letter requested school administrators to transmit the survey to their schools' teachers to permit them to complete it should they so choose. Teachers are known to be particularly at risk for burnout [16]. Respondents had the possibility of communicating their email address to the authors to be informed of the study's results. A total of 5,575 teachers completed the survey and 2,854 (51 %) provided their email address.[1]

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[1] The recruitment procedure that was followed did not allow for an estimation of teachers' response rate. Indeed, the number of teachers who actually received the survey from their school administrators is unknown.

The 5,575-teacher sample had been previously involved in a cross-sectional study [11]. For the purpose of the present, longitudinal study, the 2,854 teachers who provided their email address were re-contacted in April 2014. The authors announced to them that results of the 2012 study would soon be available and asked them to complete the survey again on a voluntary basis. A subsample of 627 teachers (22 % of the re-contacted individuals) participated in the second wave of data collection (mean age at T1: 41; 73 % female; for the health characteristics of the study sample, see Tables 1, 2). Teachers completed the follow-up on an average 21 months after completing the initial survey, a duration that is compatible with the development of chronic stress and burnout [29, 30]. The study was carried out in accordance with ethical guidelines of the Declaration of Helsinki.

We used t and Chi-square tests to assess the representativeness of the final sample *vis-à-vis* the initial sample (Table 3). Considering the entire original sample ($n = 5,575$), teachers who took part in the second wave of data collection ($n = 627$) did not significantly differ from those who did not take part ($n = 4,849$) with regard to burnout ($p = 0.23$), depressive symptoms ($p = 0.40$), age ($p = 0.63$), and length of employment ($p = 0.13$). The two groups did differ in terms of gender ($p = 0.01$); however, the value of the partial η^2 was virtually equal to zero. Considering the sample of teachers who provided their email address to the authors ($n = 2,854$), participants who took part in the second wave of data collection ($n = 627$) did not significantly differ from those who did not take part ($n = 2,227$) with regard to burnout ($p = 0.72$), depressive symptoms ($p = 0.56$), and age ($p = 0.09$). The two groups did differ in terms of gender ($p = 0.01$) and length of employment ($p = 0.01$); however, in those cases too, the partial η^2 values were virtually equal to zero.

Measures

Burnout was assessed with the emotional exhaustion and the depersonalization subscales of the Maslach Burnout Inventory (MBI; [31]), the "gold standard" in the measurement of burnout [32]. The MBI originally included a third subscale—personal accomplishment—but the view that this third subscale is a component of burnout has increasingly been doubted, notably by the developers of the MBI [1–3]. The emotional exhaustion and the depersonalization subscales were combined to obtain a global burnout index (14 items; $\alpha_{T1} = 0.88$; $\alpha_{T2} = 0.89$) given our focus on burnout as a unified entity [10, 33]. The mean score on the MBI ranges from 0 to 6.

Depression was assessed with the 9-item depression module of the Patient Health Questionnaire (PHQ-9; [34]).

Table 1 Means (*M*), standard deviations (*SD*), and correlations between the two dimensions of burnout treated distinctly, burnout as a whole, the nine diagnostic criteria for major depression treated distinctly, and depression as a whole (*n* = 627)

	1	2	3	4	5	6	7	8	9	10	11	12	13	*M*	*SD*
Emotional exhaustion	–	0.65	0.92	0.49	0.53	0.47	0.59	0.43	0.55	0.43	0.39	0.37	0.72	2.73	1.38
Depersonalization	0.50	–	0.90	0.40	0.35	0.28	0.39	0.30	0.36	0.29	0.39	0.27	0.49	1.85	1.24
Burnout	0.87	0.86	–	0.49	0.49	0.42	0.55	0.40	0.51	0.40	0.38	0.36	0.68	2.29	1.19
Anhedonia	0.55	0.42	0.56	–	0.53	0.30	0.44	0.28	0.37	0.27	0.29	0.28	0.63	0.90	0.82
Depressed mood	0.60	0.31	0.53	0.55	–	0.40	0.46	0.35	0.51	0.35	0.32	0.43	0.72	0.76	0.78
Altered sleep	0.42	0.17	0.34	0.26	0.39	–	0.44	0.41	0.37	0.36	0.38	0.27	0.69	1.28	1.04
Fatigue	0.62	0.25	0.51	0.37	0.44	0.45	–	0.47	0.47	0.37	0.33	0.22	0.73	1.52	0.91
Altered appetite	0.44	0.20	0.37	0.25	0.39	0.41	0.49	–	0.39	0.33	0.33	0.22	0.68	1.10	1.05
Guilt and self-blame	0.50	0.28	0.45	0.40	0.52	0.29	0.32	0.33	–	0.34	0.38	0.40	0.72	0.84	0.92
Cognitive impairment	0.43	0.21	0.37	0.28	0.39	0.36	0.37	0.33	0.38	–	0.43	0.24	0.62	0.74	0.81
Psychomotor alteration	0.34	0.14	0.28	0.21	0.25	0.35	0.33	0.38	0.26	0.38	–	0.27	0.61	0.40	.69
Suicidal ideation	0.35	0.17	0.31	0.35	0.43	0.29	0.23	0.23	0.36	0.23	0.23	–	0.50	0.17	.47
Depression	0.73	0.37	0.64	0.62	0.74	0.68	0.71	0.68	0.66	0.64	0.57	0.52	–	7.69	4.98
M	2.78	1.70	2.24	0.91	0.82	1.36	1.61	1.13	0.88	0.76	0.44	0.21	8.11		
SD	1.36	1.29	1.14	0.86	0.82	1.10	0.95	1.06	0.91	0.87	0.72	0.54	5.10		

Notes—All correlations are significant at $p < 0.01$. Entries below the diagonal represent results at time 1; entries above the diagonal represent results at time 2

Table 2 Means (*M*), standard deviations (*SD*), and correlations between the main study variables (*n* = 627)

	M	*SD*	1	2	3	4	5	6	7
Burnout$_{T1}$	2.24	1.14	–						
Depression$_{T1}$	8.11	5.10	0.64	–					
Burnout$_{T2}$	2.29	1.19	0.64	0.55	–				
Depression$_{T2}$	7.69	4.98	0.45	0.66	0.68	–			
Antidepressant intake$_{T1}$	0.07	0.26	0.13	0.24	0.10	0.22	–		
Lifetime history of depression$_{T1}$	0.30	0.46	0.18	0.33	0.19	0.26	0.42	–	
Antidepressant intake$_{T2}$	0.07	0.26	0.14	0.23	0.14	0.24	0.50	0.33	–
Lifetime history of depression$_{T2}$	0.33	0.47	0.20	0.31	0.22	0.28	0.29	0.62	0.36

Notes—All correlations are significant at $p < 0.01$. Antidepressant intake and lifetime depressive disorders were coded 0 when absent and 1 when present

Table 3 Sociodemographic and health characteristics of participants who took part in the second wave of data collection and of those who did not

	4,948-participant sample		2,227-participant sample		627-participant sample	
	M	*SD*	*M*	*SD*	*M*	*SD*
Burnout (…/6)	2.19	1.12	2.26	1.11	2.24	1.14
Depression (…/27)	7.93	5.19	8.25	5.30	8.11	5.10
Gender[a]	0.22	0.41	0.21	0.41	0.27	0.44
Age[b]	41	9	40	9	41	9
Length of employment[b]	15	10	15	10	16	10

[a] Gender was coded 0 for female and 1 for male
[b] Rounded to the nearest unit

The PHQ-9 grades the severity of depressive symptoms (from 0 to 27) in reference to the nine diagnostic criteria for major depression of the Diagnostic and Statistical Manual of Mental Disorders [4] and produces provisional diagnoses of depression cases. In this study, Cronbach's α for the PHQ-9 was 0.82 at T1 and 0.83 at T2. The PHQ-9 total score of each participant indexed his/her level of depression. The correlations between the two dimensions of burnout, burnout as a whole, the nine diagnostic criteria for major depression, and depression as a whole are provided in Table 1.

The participants additionally completed sociodemographic and health questionnaires in which they were asked to indicate their gender, age, length of employment in current occupation, lifetime history of depression, and antidepressant intake (Table 2).

Data analyses

Participants' changes in depression scores from T1 to T2 were preliminarily examined using an analysis of covariance (ANCOVA). The ANCOVA compared participants who experienced an *increase* in burnout symptoms between T1 and T2 ("more-burnout" group; $n = 188$; 77 % female) to participants who experienced a *decrease* in burnout symptoms between T1 and T2 ("less-burnout" group; $n = 158$; 66 % female), controlling for age and length of employment. Changes in depression scores from T1 to T2 constituted the dependent variable. We further explored the data by checking for possible gender and group × gender interaction effects. To exclude T1–T2 fluctuations in burnout symptoms that may have merely reflected measurement error or random noise, we only considered variations of at least half a standard deviation from the mean.

Next, three distinct two-step cluster analyses were carried out to examine the link between burnout and depression, using Schwarz's Bayesian Information Criterion, log-likelihood distance measure, and an unconstrained cluster number procedure. Cluster analysis allows for the grouping of a set of observations in such a way that observations in the same group are more similar to each other than to those in other groups. The similarities in question concern characteristics of interest or *classifiers*. Cluster analysis is frequently used to identify groups of individuals characterized by a same psychological or behavioral profile. In the first cluster analysis (ANALYSIS 1), burnout and depressive symptoms at T1 were used as classifiers. In the second cluster analysis, these classifiers were replaced by burnout and depressive symptoms at T2. By classifying the participants based on their levels of burnout and depressive symptoms at T1 and at T2, we tested the cross-sectional interconnections of these symptoms in the participants. In the third and final cluster analysis, the classifiers were (a) the difference between burnout symptoms at T2 and burnout symptoms at T1 and (b) the difference between depressive symptoms at T2 and depressive symptoms at T1. The aim of this last analysis was to determine whether or not teachers with increasing (or decreasing) burnout symptoms and teachers with increasing (or decreasing) depressive symptoms were the same individuals. For all three analyses, the silhouette measure of cohesion and separation indicated good cluster quality (values comprised between 0.50 and 1.00).

Finally, the clusters from ANALYSIS 1 were used as predictors in a logistic regression analysis to observe whether cluster membership at T1 predicted cases of burnout and depression at T2, controlling for gender, age, length of employment, antecedents of depressive disorders, and antidepressant intake. Cases of burnout were defined by a cutoff score of 4/6 on the MBI, based on MBI developers' suggestions [31]. Cases of depression were identified using the algorithm defined by PHQ-9 developers [11, 34]. The data were analyzed with *SPSS* version 20 (IBM; Armonk, NY, USA).

Results

Preliminary analysis

The ANCOVA revealed an effect of the group ("more-burnout" versus "less-burnout") on changes in depression scores from T1 to T2, $F (1, 340) = 102.56$, partial $\eta^2 = .23$, $p < 0.001$. No gender effect or group × gender interaction was observed, ps > 0.80. The effect of the group was significant controlling for age and length of employment. Participants who experienced an increase in burnout symptoms from T1 to T2 ("more-burnout" group) experienced on average an increase in depressive symptoms ($M = 1.78$, SD $= 3.91$). Participants who experienced a decrease in burnout symptoms from T1 to T2 ("less-burnout" group) experienced on average a decrease in depressive symptoms ($M = -3.03$, SD $= 4.01$). The between-group comparison was associated with a Cohen's d value of 1.21, indicative of a large effect size [35].

Cluster analysis

Three clusters emerged when analyzing burnout and depressive symptoms at T1 (Table 4), identifiable as "low burnout-depression" ($n = 237$), "medium burnout-depression" ($n = 209$), and "high burnout-depression" ($n = 181$). The three clusters significantly differed from each other in terms of burnout and depressive symptoms (ps < 0.001). Only two clusters emerged when analyzing burnout and depressive symptoms at T2 (Table 4), identifiable as "low burnout-depression" ($n = 403$) and "high burnout-depression" ($n = 224$). The two clusters significantly differed from one another in terms of burnout and depressive symptoms (ps < 0.001).

When trying to classify the participants based on whether they experienced a decrease or an increase in their burnout and depressive symptoms between T1 and T2, two clusters emerged (Fig. 1). The first cluster corresponded to participants who reported a decrease in both burnout (-0.68 on the MBI on average) and depression (-3.75 on the PHQ-9 on average) from T1 to T2 ($n = 262$). The second cluster comprised participants who reported an increase in both burnout ($+0.57$ on the MBI on average) and depression ($+1.96$ on the PHQ-9 on average) from T1 to T2 ($n = 365$). In other words, two individual profiles were found, one characterized by downward variations in burnout and depressive symptoms, another characterized by upward variations in burnout and depressive symptoms.

Table 4 Two-step cluster analyses

Input variables (classifiers)	MBI scores at T1 + PHQ-9 scores at T1			MBI scores at T2 + PHQ-9 scores at T2	
Cluster descriptor	Low BO/DEP	Medium BO/DEP	High BO/DEP	Low BO/DEP	High BO/DEP
Cluster size	37.8 % ($n = 237$)	33.3 % ($n = 209$)	28.9 % ($n = 181$)	64.3 % ($n = 403$)	35.7 ($n = 224$)
MBI mean score at T1 (*SD*)	1.10 (0.49)	2.59 (0.61)	3.34 (0.84)	1.83 (1.00)	2.99 (0.99)
PHQ-9 mean score at T1 (*SD*)	4.07 (2.57)	7.17 (2.47)	14.50 (3.33)	6.00 (3.91)	11.92 (4.77)
MBI mean score at T2 (*SD*)	1.51 (0.88)	2.44 (0.99)	3.15 (1.09)	1.62 (0.79)	3.50 (0.74)
PHQ-9 mean score at T2 (*SD*)	5.07 (3.57)	7.33 (4.17)	11.54 (5.04)	5.05 (3.01)	12.44 (4.24)
Cases of burnout at T2	0.8 %	6.7 %	21.0 %	0.0 %	24.1 %
Cases of depression at T2	1.7 %	6.2 %	27.1 %	.5 %	28.6 %
Gender (% male)	23 %	31 %	26 %	26 %	27 %
Mean age (*SD*)	41.45 (8.77)	39.32 (8.74)	41.97 (9.42)	42.38 (8.90)	42.80 (9.41)
Mean LoE (*SD*)	16.37 (9.80)	14.58 (9.08)	16.88 (10.06)	17.27 (9.59)	17.79 (10.12)
Antidepressant intake	3 %	5 %	15 %	4 %	12 %
Lifetime depressive disorders	21 %	24 %	50 %	26 %	47 %

BO burnout, *DEP* depression, *LoE* length of employment, *SD* standard deviation, *T1* first wave of measurement, *T2* second wave of measurement

Fig. 1 Between-assessment variations in burnout and depression in the decrease-in-burnout-and-depression cluster (cluster 1; $n = 262$) and the increase-in-burnout-and-depression cluster (cluster 2; $n = 365$). Maximal and minimal values related to each ordinate axis correspond to 50 % of theoretical maximal scores of the MBI (primary axis, *left*) and of the PHQ-9 (secondary axis, *right*), such that the data plotted along both dimensions refer to a similar visual space. *BO* burnout, *DEP* depression, *MBI* Maslach Burnout Inventory, *PHQ-9* 9-item depression module of the Patient Health Questionnaire, *T1* first wave of measurement, *T2* second wave of measurement
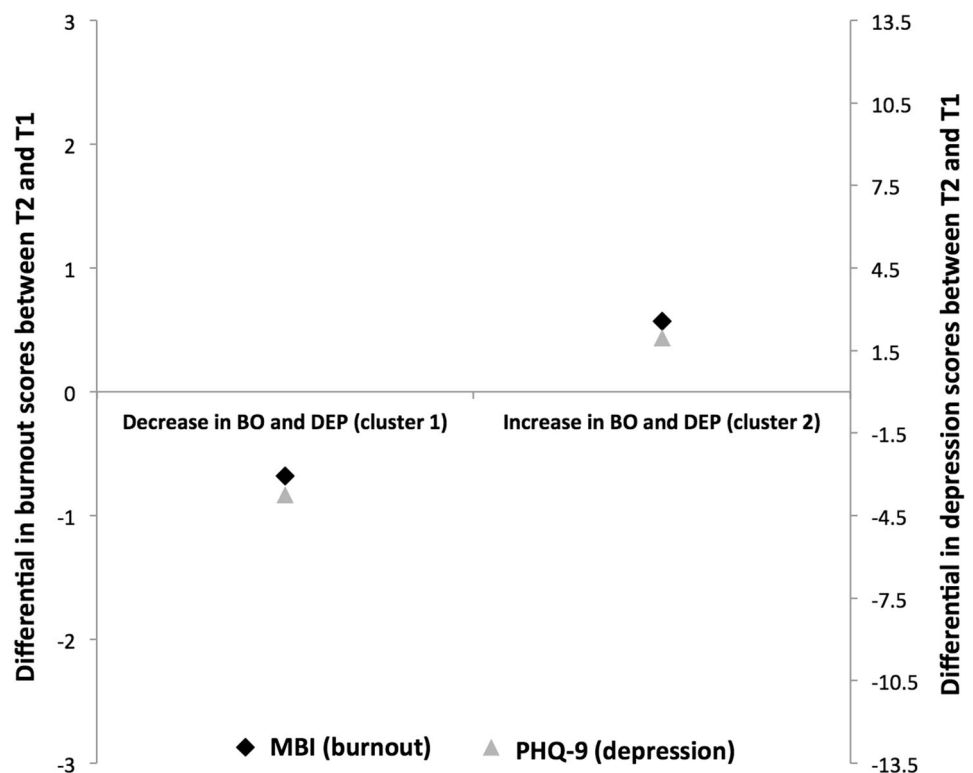
Logistic regression analysis

The logistic regression analysis indicated that cluster membership at T1 predicted cases of burnout and depression at T2. Teachers in the T1 "low burnout-depression" cluster served as the reference group. Belonging to the T1 "medium burnout-depression" cluster increased the T2 risk of being burned out (odds ratio OR = 10.21; $p < 0.01$) and that of being depressed (OR = 3.65; $p < 0.05$). To an even greater extent, belonging to the T1 "high burnout-depression" cluster increased the T2 risk of being burned out (OR = 30.09; $p < 0.001$) and that of being depressed (OR = 17.98; $p < 0.001$).

Discussion

The present study examined whether burnout and depressive symptoms are separable from each other using a longitudinal design (mean follow-up duration: 21 months) and relying on a 627-teacher sample. Burnout and depressive symptoms clustered both at T1 and T2, with cluster membership at T1 predicting cases of burnout and depression at T2. Importantly, changes in burnout and depressive symptoms at follow-up were found to be intertwined. These results were anticipated in a preliminary analysis indicating that individuals who experienced an increase in burnout tended to experience a concomitant increase in depression, and that individuals who experienced a decrease in burnout tended to experience a concomitant decrease in depression.

In conjunction with recent findings showing that the symptoms of burned out workers cannot be distinguished from those of depressed patients in a diagnostically significant manner [10], our results lend credence to the hypothesis that burnout symptoms are embedded in a wider depressive syndrome. It has been argued in the past that burnout's dimensions may be fruitfully conceptualized as work-related depressive symptoms [14]. Our findings suggest that this early claim may have been given insufficient consideration so far. By contrast, our results do not support the widely held view that burnout is an "independent syndrome" (p. 218) [13] or a "mental disorder" that is differentiated from depression (p. 5) [18].

Maslach and Leiter [2] have contended, based on their moderate correlation, that emotional exhaustion and depersonalization "go together" and constitute the primary dimensions of burnout (p. 501). In the present study, however, emotional exhaustion was found to be more strongly associated with depression than with depersonalization (Table 1). This finding, often reported but rarely discussed [1, 10, 36], suggests that depressive symptoms could be considered components of burnout at least as much as depersonalization, thereby calling the basic structure of the burnout syndrome into question [37–40]. The resolution of these structural contradictions should be a priority for burnout researchers.

Building on the assumption, made by some researchers, that burnout and depression develop in tandem [26, 41], it may be tempting to discuss the obtained results in terms of co-morbidity. However, such an approach is in our estimation untimely, given the current absence of a clear clinical distinction between burnout and depression and the fact that burnout is not considered a distinct form of psychopathology in international nosological classifications [4, 10, 42–44]. Reasoning in terms of co-morbidity would be reasoning as if the problem awaiting resolution ("Is burnout a distinct entity?") has already been resolved.

The present study has at least four limitations. First, we relied exclusively on self-report to assess (cases of) depression. Second, we focused on only one occupational group, teachers, thus restricting the external validity of the study. Third, we used a convenience sample whose representativeness is not known; thus, burned out and depressed teachers may have been over- or under-represented in this study. Fourth, our findings are contingent on the conceptualization of burnout that we used and should not be generalized to other conceptualizations [38, 39] before more research is carried out.

Our findings support the hypothesis that burnout and depression overlap [10, 11, 14, 45]. However, further clinical research is needed to confirm or disconfirm the view that burnout falls under the umbrella of depression and can be characterized as an occupational depressive syndrome. In this regard, it would be important to determine whether investigating the presence of burnout in addition to that of *work-related* depression [20, 46] is therapeutically useful. Moreover, it may be fruitful to examine more closely the genesis of the burnout construct. Indeed, rather than a nosological entity that is distinct from depression, the burnout construct may reflect *a psychosocial view of depression*. Depression is deeply rooted in the history of medical science, with its modern conceptualization having accompanied the rise of psychiatry in the 19th century [47]. By contrast, burnout is a 40-year-old construct that is the product of a psychosocial, rather than of a clinical or psychiatric, approach to ill-health [16]. All in all, the initial distinction between burnout and depression may be symptomatic of different scientific traditions, rather than of different pathological phenomena.

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