

Academic Unemployment and Psychological Burnout Among PhD Holders in Algeria: Towards an Innovative Strategy for Professional Integration and Competency Investment

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Received: 02/03/2026 ; Accepted: 24/06/2026 ; Published : 02/09/2026

Abstract

Purpose – This study examines the relationship between academic unemployment and psychological burnout among unemployed PhD holders in Algeria and proposes an evidence-based strategy for their professional integration and the investment of their scientific competencies.

Design/methodology/approach – A descriptive-analytical, cross-sectional design was adopted. An electronic questionnaire covering academic unemployment, the three dimensions of psychological burnout (emotional exhaustion, depersonalization, reduced personal accomplishment), and perceived social support was distributed to a population of 112 unemployed PhD holders drawn from a dedicated postdoctoral electronic network; 57 valid responses (50.89%) were retained for analysis. Data were examined using descriptive statistics, Pearson correlation, independent-samples t-tests, one-way ANOVA, and hierarchical moderated regression.

Findings – Academic unemployment was positively and significantly associated with emotional exhaustion ($r = .496$, $p < .001$), depersonalization ($r = .489$, $p < .001$), and reduced personal accomplishment ($r = .751$, $p < .001$). No statistically significant differences in burnout emerged by gender, discipline, or unemployment duration, and perceived social support did not significantly moderate the academic unemployment–burnout relationship. Respondents overwhelmingly favored establishing a national platform to register and connect unemployed PhD holders with employment opportunities (87.7%), alongside direct integration (47.4%).

Practical implications – The findings support a proactive, three-level competency-management policy combining urgent employment measures, structural alignment between doctoral training and labor-market needs, and sustained professional and psychological support for unemployed PhD holders.

Originality/value – This study is among the first to empirically link post-graduation academic unemployment—rather than the pressures of doctoral training itself—to psychological burnout in the Algerian and broader Arab context, and to translate the empirical findings into an actionable, multi-level integration strategy.

Keywords: Academic unemployment; Psychological burnout; PhD holders; Professional integration; Competency investment; Algeria

1. Introduction

1.1 Background and Context

The higher education sector in Algeria has witnessed rapid quantitative expansion over the past two decades, marked by a significant increase in the number of students enrolled in doctoral programs. However, this growth has not been matched by a comparable expansion in available academic jobs

within universities and research centers. This structural gap between doctoral training outputs and institutional absorption capacity has generated the phenomenon of “academic unemployment,” which refers to the condition of holders of the highest scientific degrees who remain outside the labor market matching their specialization despite possessing advanced research and scientific competencies. Some press and institutional sources estimate the number of unemployed PhD holders in Algeria to be in the tens of thousands, prompting authorities to adopt temporary, short-term absorption solutions without fundamentally addressing the structural imbalance between training and employment (Cornér, Löfström, & Pyhältö, 2017).

The consequences of this phenomenon are not limited to the economic dimension associated with wasted human-capital investment; they also extend to the psychological and social dimensions of degree holders, who find themselves caught in a contradiction between their supposed scientific status and their actual professional reality. Contemporary psychological literature indicates that prolonged unemployment, particularly among highly qualified groups, is associated with elevated psychological distress and job burnout. While this condition was traditionally studied in the context of high-contact human-service professions, its scope has expanded to include doctoral students and PhD holders themselves, given the pressures of scientific production, professional uncertainty, and weak integration prospects (Mackie & Bates, 2019); (Martínez-García & al, 2024).

1.2 Research Gap and Contribution of the Study

Despite growing global interest in the mental health of doctoral students (Devine & Hunter, 2017), studies directly linking post-graduation academic unemployment—as distinct from the pressures of the training phase itself—to levels of psychological burnout among PhD holders remain scarce, particularly in the Algerian and broader Arab contexts. Most available studies addressing higher education in Algeria approach the phenomenon from an economic or public-policy perspective (e.g., education-job mismatch and employment policy), without deeply examining the individual psychological cost of this unemployment or proposing practical integration models that address both its psychological and institutional dimensions.

This study seeks to bridge this gap by analyzing the relationship between academic unemployment and the dimensions of psychological burnout among PhD holders in Algeria, relying on an electronically distributed questionnaire administered to a sample of unemployed PhD holders. It contributes to the literature in three ways: (i) it is among the first studies in Algeria to test the direct, post-graduation relationship between academic unemployment and the three burnout dimensions, rather than the burnout associated with the training phase itself; (ii) it jointly mobilizes four complementary theoretical frameworks—latent deprivation, conservation of resources, education-job mismatch, and career construction—to interpret this relationship in the Algerian context; and (iii) it translates the empirical findings into an actionable, multi-level strategy for the professional integration and competency investment of unemployed PhD holders, tailored to the specificities of the Algerian environment.

2. Theoretical Framework

Interpreting the relationship between academic unemployment and psychological burnout requires drawing upon a set of integrated theoretical frameworks that intersect in explaining the psychological impact of losing or lacking work, as well as potential pathways of professional adaptation.

2.1 Latent Deprivation Theory

Developed by Jahoda based on her pioneering field study of the Austrian community of Marienthal in the 1930s, this theory posits that work provides not only a “manifest function” of material income

but also five “latent functions” essential for mental health: time structure, social contact outside the family, status, collective purpose, and regular activity (Jahoda, 1982). Depriving an individual of these latent functions, as is the case for the unemployed PhD holder, leads to a gradual deterioration in mental health, a finding confirmed by recent meta-analyses covering dozens of studies (Paul, Scholl, Moser, & Zechmann, 2023). (Fryer, 1986)expanded this approach through the “Agency Restriction Model,” pointing out that material deprivation and the constraint imposed on one’s ability to plan for the future exacerbate the psychological impact of unemployment—a dimension crucial for understanding the predicament of PhD holders who have invested long years in training that fails to lead to professional or financial stability.

2.2 Conservation of Resources (COR) Theory

Formulated by Hobfoll on the premise that individuals strive to acquire, retain, and protect resources (material, social, and psychological), COR theory suggests that psychological stress occurs when these resources are actually or potentially lost, or when an individual invests substantial effort without a corresponding return of resources (Hobfoll & Freedy, 1993). In the context of academic unemployment, obtaining a PhD represents a massive investment in “competency resources” (time, mental effort, professional ambition). When this investment is not met with employment returns, the individual enters a “loss spiral” that gradually exhausts psychological resources—the explanatory mechanism traditionally linking resource depletion to the onset of burnout symptoms (Hobfoll & Freedy, 1993), driven by the human need for appreciation.

2.3 Education–Job Mismatch Theory

Grounded in human capital theory, which holds that the value of education is realized only when invested in a job capable of absorbing the acquired skill level (Becker, 1964), this framework explains that when individuals experience “overqualification” or remain entirely outside the labor market despite high qualifications, “human capital waste” occurs. Empirically, this waste is associated with decreased satisfaction and diminished psychological well-being (Vancea, M & al, 2019). Its severity intensifies among holders of the highest degrees, since the absence of any academic position represents the failure of a career path that was supposed to be linear and progressive.

2.4 Career Construction Theory

Savickas’s framework provides a necessary complementary dimension, as it not only explains the negative impact of unemployment but also opens the door to understanding possible adaptation pathways through the concept of “career adaptability” across its four dimensions—concern, control, curiosity, and confidence (Savickas, 2005). This framework offers the theoretical foundation for the integration model proposed at the conclusion of this study, addressing not only burnout symptoms but also the individual’s capacity to redirect their career path and invest their competencies outside the traditional academic track if necessary.

2.5 Integration of Theoretical Frameworks

These four frameworks intersect at a fundamental point: academic unemployment is not merely a transient economic condition but a cumulative experience that depletes an individual’s psychological resources (Hobfoll & Freedy, 1993), deprives them of the latent functions of work (Jahoda, 1982), squanders their investment in scientific capital (mismatch theory), and necessitates the mobilization of adaptive capacities to rebuild an alternative career path (Savickas, 2005). In other words, PhD holders—like any individuals—need a sense of job security through which they can progress toward their goals within a framework of professional development; this security is vital for enabling them

to function as researchers capable of path-breaking discovery and high-quality production when provided with an appropriate environment.

3. Literature Review and Hypotheses Development

Reviewing prior literature and developing hypotheses are essential steps in building the current study, allowing key findings on academic unemployment and psychological burnout to be identified and the relationships examined by earlier research among these variables to be uncovered. The following subsections focus on the psychological and professional impacts of unemployment and job instability among highly qualified individuals, with particular attention to the three burnout dimensions, potential demographic and professional differences, and the potential moderating role of social support.

3.1 Academic Unemployment and Emotional Exhaustion (H1)

Emotional exhaustion is defined as an individual's feeling of emotional and physical depletion resulting from continuous stress without adequate coping resources; it is the first and most central dimension of the burnout syndrome in the classic model of (Maslach & Jackson, The measurement of experienced burnout, 1981). Comprehensive meta-analytic reviews have demonstrated that prolonged unemployment is causally linked to declining mental health, an impact that worsens as the duration of unemployment increases (Mackie & Bates, 2019). Specifically regarding PhD holders, recent systematic reviews have shown that ongoing post-graduation professional uncertainty constitutes a prominent catalyst for emotional exhaustion, even after the pressures associated with the training phase itself have been overcome (Martínez-García & al, 2024). Accordingly, it is hypothesized that:

H1: There is a statistically significant positive relationship between academic unemployment and the level of emotional exhaustion among PhD holders in Algeria.

3.2 Academic Unemployment and Depersonalization (H2)

Depersonalization (cynicism) refers to an individual's adoption of a detached or cynical attitude toward their professional and scientific environment as a defensive mechanism against accumulated exhaustion (Maslach, Schaufeli, & Leiter, Job burnout, 2001). For unemployed PhD holders, this depersonalization takes the specific form of a gradual loss of enthusiasm for scientific research and academic affiliation itself, a phenomenon documented by studies addressing the impact of poor supervision and weak institutional support on declining academic commitment among early-career researchers (Cornér, Löfström, & Pyhältö, 2017). From a conservation-of-resources perspective, repeated failed integration attempts can be interpreted as a continuous depletion of an individual's symbolic resources (scientific identity, sense of belonging), driving them toward psychological and defensive distance from the academic institution that failed to absorb them (Hobfoll & Freedy, 1993). Accordingly:

H2: There is a statistically significant positive relationship between academic unemployment and the level of depersonalization (academic cynicism) among PhD holders in Algeria.

3.3 Academic Unemployment and Reduced Personal Accomplishment (H3)

Reduced personal accomplishment reflects a decline in an individual's evaluation of their self-competence and the value of their achievements; it is the burnout dimension most closely associated with the loss of the "latent function" related to social status and sense of utility in Jahoda's model (1982). When a PhD holder remains without a professional position in which to invest their degree, a sense of futility regarding years of scientific effort emerges, intersecting with the "overqualification" literature linking unutilized skills to diminished professional self-esteem. The

“human capital waste” literature supports this view, as the individual feels that their scientific investment has not translated into socially recognized value (Becker, 1964). Accordingly:

H3: There is a statistically significant positive relationship between the level of academic unemployment and the level of reduced personal accomplishment among PhD holders in Algeria.

3.4 Demographic and Professional Differences in Burnout (H4)

Recent systematic reviews indicate that levels of burnout and psychological distress among researchers and higher-degree holders vary with factors such as gender, scientific discipline, career stage, and institutional context (Koutsimani, Montgomery, & Georganta, , 2019). For instance, some studies suggest that degree holders in the humanities and social sciences face greater difficulty finding alternative employment outlets outside academia compared with scientific and technical disciplines, which may exacerbate their burnout levels relative to their peers. Accordingly:

H4: There are statistically significant differences in the level of psychological burnout among unemployed PhD holders in Algeria attributable to gender, discipline, and duration of unemployment.

3.5 The Moderating Role of Perceived Social Support (H5)

Drawing on conservation-of-resources theory, social support (family and professional) represents an external resource that can mitigate the rate of psychological-resource depletion caused by unemployment (Hobfoll & Freedy, 1993). Studies on the well-being of doctoral students and PhD holders confirm that effective social-support networks are associated with lower rates of exhaustion and academic attrition, even amid ongoing objective pressures (Zhang, Litson, & Feldon, 2022). Accordingly:

H5: Perceived social support mitigates the strength of the positive relationship between academic unemployment and psychological burnout among PhD holders in Algeria.

4. Research Problem, Questions, and Objectives

4.1 Statement of the Problem

Despite growing global interest in the mental health of doctoral students and PhD holders, academic unemployment in Algeria continues to be addressed almost exclusively from an economic and policy perspective—focusing on the number of unemployed PhD holders, employment policies, and integration measures—while the individual psychological cost of this situation has received insufficient research attention. One of the most prominent aspects of this cost is the potential increase in symptoms of psychological burnout across its three dimensions. The problem is further complicated by the absence of local measurement tools designed specifically for unemployed PhD holders in Algeria, which limits the ability to accurately gauge their burnout level and the factors associated with its exacerbation or mitigation, including the potential moderating role of social support.

Accordingly, the research problem lies in understanding the psychological cost of academic unemployment among PhD holders in Algeria, determining the nature of its relationship with psychological burnout, identifying potential differences in burnout level according to demographic and professional characteristics, and uncovering the extent to which social support moderates this relationship. The main research question is formulated as follows: Is there a statistically significant relationship between academic unemployment and psychological burnout among unemployed PhD holders in Algeria, and what is the role of demographic and professional characteristics and social support in this relationship?

4.2 Research Questions

- Is there a statistically significant relationship between academic unemployment and the level of emotional exhaustion among unemployed PhD holders in Algeria?
- Is there a statistically significant relationship between academic unemployment and the level of depersonalization (academic cynicism) among them?
- Is there a statistically significant relationship between academic unemployment and the level of perceived personal accomplishment among them?
- Are there statistically significant differences in the level of psychological burnout among unemployed PhD holders attributable to gender, discipline, and duration of unemployment?
- Does perceived social support mitigate the strength of the positive relationship between academic unemployment and psychological burnout?

4.3 Research Hypotheses

- H1: There is a statistically significant positive relationship between academic unemployment and the level of emotional exhaustion among PhD holders in Algeria.
- H2: There is a statistically significant positive relationship between academic unemployment and the level of depersonalization (academic cynicism) among PhD holders in Algeria.
- H3: There is a statistically significant positive relationship between academic unemployment and the level of perceived personal accomplishment among PhD holders in Algeria.
- H4: There are statistically significant differences in the level of psychological burnout among unemployed PhD holders in Algeria attributable to gender, discipline, and duration of unemployment.
- H5: Perceived social support mitigates the strength of the positive relationship between academic unemployment and psychological burnout among PhD holders in Algeria.

4.4 Research Objectives

- Uncover the nature of the relationship between academic unemployment and each of the three dimensions of psychological burnout among unemployed PhD holders in Algeria.
- Uncover differences in psychological burnout level among unemployed PhD holders according to gender, discipline, and duration of unemployment.
- Uncover the moderating role of perceived social support in the relationship between academic unemployment and psychological burnout.
- Propose a model for integration and competency investment, based on the perceptions of the studied sample, tailored to the specificities of the Algerian environment.

4.5 Significance of the Study

Scientific significance: to the researcher's knowledge, this study is among the first in Algeria to address the direct relationship between post-graduation academic unemployment and psychological burnout across its three dimensions, contributing to expanding the study of the phenomenon beyond its purely economic framework.

Theoretical significance: the study adapts four global theoretical frameworks—latent deprivation theory, conservation of resources theory, education-job mismatch theory, and career construction theory—to the institutional, economic, and social specificities of the Arab and Maghreb context.

Practical significance: the findings offer decision-makers and higher-education officials a deeper understanding of the psychological impacts of academic unemployment, informing the design of targeted policies and programs.

Significance for model-building: the study provides an empirical basis for building a model to integrate unemployed PhD holders and invest their scientific competencies in a manner responsive to their own perceptions rather than to solutions disconnected from their actual reality.

4.6 Operational Definitions

Academic unemployment: the condition of a PhD holder remaining outside the academic labor market, or outside a job commensurate with their level of scientific qualification and specialization, despite possessing the qualifications that should afford them appropriate professional opportunities; it also includes the lack of effective utilization of the scientific competence acquired during the doctoral path.

Psychological burnout: the negative psychological state that may form in a PhD holder as a result of sustained academic unemployment accompanied by pressures, frustration, and a sense of unutilized qualifications; operationally, the score obtained across the three dimensions of the study instrument.

Emotional exhaustion: the level of psychological and emotional depletion that may accompany a PhD holder's continuous search for a professional opportunity without reaching a job commensurate with their qualifications.

Depersonalization: a state of apathy, indifference, or psychological withdrawal that may develop toward one's professional and social environment as a result of prolonged unemployment and recurring pressures.

Reduced personal accomplishment: the decline in a PhD holder's sense of ability to self-actualize and invest their scientific and professional potential, resulting from failing to secure an opportunity to employ their acquired knowledge and skills.

Accordingly, the study treats academic unemployment as the independent variable and psychological burnout—analyzed through its three dimensions—as the dependent variable.

4.7 Delimitations of the Study

- Substantive: the relationship between academic unemployment and psychological burnout across its dimensions among unemployed PhD holders, the role of social support, and a proposed integration model.
- Temporal: the study was conducted during the 2025/2026 academic year.
- Spatial: Algeria, via electronic distribution of the questionnaire not restricted to any specific region or province.
- Human: unemployed PhD holders from various disciplines, members of the targeted electronic group, seeking postdoctoral opportunities.

5. Materials and Methods

5.1 Research Design

The study adopted a descriptive-analytical, cross-sectional design, suited to describing the phenomenon of academic unemployment among PhD holders, monitoring the manifestations of associated psychological burnout, and analyzing the relationships among the study variables. The study does not rely on experimental intervention or a therapeutic program; rather, it observes reality as it stands and analyzes it statistically.

5.2 Population and Sample

The population consists of 112 unemployed PhD holders enrolled in an electronic social-media group dedicated to exchanging information on postdoctoral opportunities and academic and professional openings, characterized by diversity in scientific discipline. An electronic questionnaire was distributed to the population, yielding 57 valid responses (50.89% response rate). The sample is a

non-probability convenience sample, justified by the difficulty of comprehensively surveying this population and by the study's reliance on an electronic questionnaire.

Table 1. Study Population and Response Rate

Statement	n	%
Total study population	112	100
Non-respondents	55	49.11
Valid responses retained for analysis	57	50.89
Total	112	100

Source: prepared by the author from the electronic-questionnaire distribution results.

Regarding sample characteristics (Table 2), 31 respondents were female (54.4%) and 26 male (45.6%). Most respondents were aged 30–35 years (52.6%), followed by 36–40 (24.6%), over 40 (15.8%), and under 30 (7%). Social and human sciences accounted for the largest disciplinary share (42.1%), followed by economic and legal sciences (31.6%) and exact and technical sciences (26.3%). A majority (73.7%) had been unemployed for one to three years, 14% for more than three years, and 12.3% for less than a year. Job-seeking effort varied widely, from no attempts (7%) to more than twenty attempts (5.3% at 20 attempts); two attempts was the single most common category (19.3%).

Table 2. Sample Characteristics (Demographic and Professional)

Variable	Category	n	%
Gender	Male	26	45.6
	Female	31	54.4
	Total	57	100
Age	Under 30	4	7.0
	30–35	30	52.6
	36–40	14	24.6
	Over 40	9	15.8
	Total	57	100
Discipline	Social & Human Sciences	24	42.1
	Economic & Legal Sciences	18	31.6
	Exact & Technical Sciences	15	26.3
	Total	57	100
Unemployment duration	Less than 1 year	7	12.3
	1–3 years	42	73.7
	Over 3 years	8	14.0
	Total	57	100

Source: prepared by the author based on SPSS output.

An exploratory item examined participation in the 2025 teacher-recruitment competition in the education sector, chosen as an available employment opportunity requiring qualifications below a PhD. Open-ended reasons for accepting or declining this opportunity were coded into four categories. As shown in Table 3, 43.9% of respondents had participated. Economic necessity (need for work, income, escaping unemployment) was the most frequent reason (36.8%), followed by attachment to the academic track (29.8%), perceived qualification–job mismatch (15.8%), and other personal/professional reasons (17.5%).

Table 3. Participation in Recruitment Competitions Outside the University Track

Variable	Category	n	%
Participation in 2025 competition	Yes	25	43.9
	No	32	56.1
	Total	57	100
Reasons for participation/rejection	Need for work, income, escaping unemployment	21	36.8
	Desire for academic work/teaching	17	29.8
	Job mismatch with qualifications	9	15.8
	Other professional/personal reasons	10	17.5

Source: prepared by the author based on SPSS output.

5.3 Instrumentation

A field questionnaire was designed to capture academic unemployment, the three burnout dimensions, and perceived social support, with items phrased for clarity and alignment with the study objectives. Responses were collected using a reversed-coded agreement scale (lower scores denote stronger agreement, as reported in Tables 5 and 6).

5.4 Validity and Reliability

Cronbach's alpha was used to assess internal consistency; self-validity was estimated as the square root of reliability. As shown in Table 4, all coefficients exceeded the conventional 0.70 threshold, indicating good-to-very-high internal consistency and supporting the psychometric adequacy of the instrument for subsequent analysis.

Table 4. Reliability and Validity of the Study Instrument

Scale / Dimension	Cronbach's α	Validity ($\sqrt{\alpha}$)
Academic unemployment axis	0.775	0.880
Emotional exhaustion	0.929	0.963
Depersonalization	0.812	0.901
Reduced personal accomplishment	0.765	0.874
Psychological burnout (overall)	0.908	0.952
Total instrument	0.907	0.952

Source: prepared by the author based on SPSS output.

5.5 Data Analysis Procedure

Data were analyzed using SPSS. Descriptive statistics (means, standard deviations, frequencies, percentages) characterized the sample and item-level responses. Pearson correlation tested H1–H3. An independent-samples t-test examined gender differences, and one-way ANOVA (with Tukey post-hoc tests) examined differences by discipline and unemployment duration, together testing H4. Hierarchical moderated regression, using mean-centered predictors and an interaction term, tested the moderating role of social support (H5).

5.6 Ethical Considerations

Participation in the electronic questionnaire was voluntary, and no personally identifying information was required for the statistical analysis reported here. As a non-interventional, anonymous survey of adult volunteers, the study involved no physical, legal, or professional risk to respondents.

6. Results

6.1 Descriptive Analysis of Academic Unemployment

Descriptive analysis of the academic-unemployment axis revealed a high overall agreement trend ($M = 1.920$, $SD = 1.043$, i.e., “strongly agree” on the reversed-coded scale). The most prominent item was the perceived absence of tangible professional gain from PhD preparation ($M = 1.526$), followed by perceived career instability since graduation ($M = 1.614$) and a sense of institutional abandonment after the thesis defense ($M = 1.702$). The item with the lowest mean agreement—yet the highest variance—concerned the perceived lack of a suitable place for the respondent’s qualification in the Algerian labor market ($M = 2.597$, $SD = 1.425$), signaling greater heterogeneity in perceptions of labor-market fit.

Table 5. Descriptive Statistics for the Academic Unemployment Axis

Item	M	SD	Rank	Trend
01. No suitable place in the labor market	2.597	1.425	7	Agree
02. University abandoned me after defense	1.702	0.962	3	Strongly agree
03. Large gap: training vs. opportunities	2.070	1.237	6	Agree
04. Difficulty finding integration information	2.053	1.007	5	Agree
05. Years of preparation, no tangible gain	1.526	0.734	1	Strongly agree
06. Recruitment criteria ignore my competence	1.877	1.036	4	Agree
07. Instability in my professional path	1.614	0.901	2	Strongly agree
Axis overall	1.920	1.043	—	Strongly agree

Source: prepared by the author based on SPSS output.

6.2 Descriptive Analysis of Burnout and Social Support

The overall burnout mean was 1.875 ($SD = 1.150$), reflecting a general tendency toward agreement with burnout-related statements. Emotional exhaustion ranked first among the three dimensions ($M = 1.535$, $SD = 0.894$), followed by depersonalization ($M = 1.986$, $SD = 1.109$) and reduced personal accomplishment ($M = 2.105$, $SD = 1.146$). Perceived social support recorded a mean of 2.351 ($SD = 1.141$), indicating a moderate-to-high tendency toward agreement with statements of family and social support. At this descriptive stage, these results characterize the sample’s response levels only; they do not, by themselves, establish relationships between variables, which are addressed through hypothesis testing below.

Table 6. Descriptive Statistics for Burnout Dimensions and Perceived Social Support

Dimension	M	SD	Trend
Emotional exhaustion	1.535	0.894	Strongly agree
Depersonalization / cynicism	1.986	1.109	Agree
Reduced personal accomplishment	2.105	1.146	Agree
Psychological burnout (overall)	1.875	1.150	Agree
Perceived social support	2.351	1.141	Agree

Source: prepared by the author based on SPSS output.

6.3 Hypothesis Testing: Correlational Analysis (H1–H3)

Pearson correlations, based on the 57 respondents, tested the relationships between academic unemployment and the three burnout dimensions. All three coefficients were positive and statistically significant at $p < .001$ (Table 7). H1 was supported by a moderate positive correlation with emotional exhaustion ($r = .496$). H2 was supported by a moderate positive correlation with depersonalization ($r = .489$). H3 was supported by a relatively strong positive correlation with reduced personal

accomplishment ($r = .751$)—the strongest of the three relationships. Correlation coefficients establish the existence, direction, and strength of association but do not, on their own, establish causality.

Table 7. Pearson Correlations Testing H1–H3

Hypothesis	Dependent variable	r	p	Result
H1	Emotional exhaustion	0.496**	< .001	Supported
H2	Depersonalization	0.489**	< .001	Supported
H3	Reduced personal accomplishment	0.751**	< .001	Supported

Note. ** $p < .01$ (two-tailed). $N = 57$. Source: prepared by the author based on SPSS output.

6.4 Hypothesis Testing: Group Differences (H4)

An independent-samples t-test examined gender differences; one-way ANOVA examined differences by discipline and unemployment duration. Levene's test indicated homogeneity of variance in all three cases (gender: $F = 1.351$, $p = .250$; discipline: $F = 2.765$, $p = .072$; duration: $F = 3.134$, $p = .052$).

Burnout means were slightly higher among females ($M = 23.42$, $SD = 9.36$) than males ($M = 21.42$, $SD = 8.54$), but the difference was not statistically significant, $t(55) = -0.835$, $p = .408$. Across disciplines, means ranged narrowly from 21.94 (economic & legal sciences) to 22.88 (social & human sciences), a non-significant difference, $F(2, 54) = 0.054$, $p = .947$; Tukey post-hoc comparisons likewise showed no significant pairwise differences ($p = .943$ to $.995$). Across unemployment-duration groups, means ranged from 22.17 (1–3 years) to 23.63 (over 3 years), again non-significant, $F(2, 54) = 0.115$, $p = .892$, with no significant Tukey pairwise differences ($p = .910$ to $.997$). H4 was therefore not supported: burnout levels did not differ significantly by gender, discipline, or unemployment duration in this sample.

Table 8. Independent-Samples t-Test for Burnout by Gender

Gender	n	M	SD	t	df	p
Male	26	21.4231	8.53779	-0.835	55	0.408
Female	31	23.4194	9.35868			

Table 9. One-Way ANOVA for Burnout by Academic Discipline

Source	SS	df	MS	F	p
Between groups	9.076	2	4.538	0.054	0.947
Within groups	4497.169	54	83.281		
Total	4506.246	56			

Table 10. Descriptive Statistics for Burnout by Duration of Unemployment

Duration since graduation	n	M
Less than 1 year	7	23.2857
1–3 years	42	22.1667
More than 3 years	8	23.6250

Table 11. One-Way ANOVA for Burnout by Duration of Unemployment

Source	SS	df	MS	F	p
Between groups	19.109	2	9.554	0.115	0.892

Within groups	4487.137	54	83.095		
Total	4506.246	56			

Table 12. Summary of Hypothesis 4 Testing

Variable	Test	Statistic	p	Result
Gender	Independent t-test	$t = -0.835$	0.408	Not significant
Discipline	One-way ANOVA	$F = 0.054$	0.947	Not significant
Unemployment duration	One-way ANOVA	$F = 0.115$	0.892	Not significant

Source: prepared by the author based on SPSS output.

6.5 Hypothesis Testing: Moderation Analysis (H5)

Hierarchical regression tested whether perceived social support moderates the academic unemployment–burnout relationship. Academic unemployment and social support were mean-centered, and their product term was entered in a second step. Model 1 (main effects) explained 45.3% of the variance in burnout, $\Delta F(2, 54) = 22.329$, $p < .001$. Adding the interaction term in Model 2 raised R^2 to .471 ($\Delta R^2 = .018$), a non-significant increment, $\Delta F(1, 53) = 1.829$, $p = .182$ (Table 13). In Model 2, academic unemployment remained a significant positive predictor of burnout ($B = 1.203$, $\beta = .652$, $t = 6.424$, $p < .001$), while perceived social support showed no significant direct effect ($B = 0.686$, $\beta = .087$, $p = .396$). The interaction term itself was non-significant ($B = 0.234$, $\beta = .140$, $t = 1.352$, $p = .182$) and, notably, positive rather than negative in sign—opposite to the buffering direction hypothesized. H5 was therefore not supported: perceived social support did not significantly moderate the relationship between academic unemployment and burnout in this sample.

Table 13. Hierarchical Regression Model Summary (Moderation Analysis)

Model	R^2	ΔR^2	ΔF	df	p (ΔF)
1: Academic unemployment + social support	0.453	0.453	22.329	2, 54	< .001
2: Model 1 + interaction term	0.471	0.018	1.829	1, 53	0.182

Table 14. Regression Coefficients for the Moderation Model

Model	Predictor	B	β	t	p	VIF
1	Academic unemployment	1.244	0.674	6.680	0.000	1.004
	Perceived social support	0.484	0.062	0.611	0.544	1.004
2	Academic unemployment	1.203	0.652	6.424	0.000	1.031
	Perceived social support	0.686	0.087	0.857	0.396	1.040
	AU $\times$ social support (interaction)	0.234	0.140	1.352	0.182	1.067

Source: prepared by the author based on SPSS output.

6.6 Respondents' Perceptions of Solutions and Institutional Responsibility

Beyond hypothesis testing, respondents were asked to evaluate possible institutional mechanisms for addressing academic unemployment (multiple selections permitted). Establishing a national electronic mechanism to register unemployed PhD holders and connect them directly with employment opportunities received the strongest support (87.7%), followed by involvement in international cooperation and externally funded projects (61.4%) and a “Bridge” system linking university laboratories with economic institutions (49.1%). An “affiliated researcher/temporary professor” scheme was supported by 42.1% of respondents, while measures expanding non-university employment received comparatively less support (31.6–33.3%), and training, psychological support,

and business-incubator measures received the least (21.1–22.8%), though these remain relevant given the study’s psychological findings.

Table 15. Proposed Mechanisms for Addressing Academic Unemployment (Multiple Responses)

Proposed mechanism	n	%	Rank
National platform to register/connect PhD holders with jobs	50	87.7	1
International cooperation & externally funded projects	35	61.4	2
“Bridge” system: labs ↔ economic institutions	28	49.1	3
Affiliated researcher / temporary professor scheme	24	42.1	4
Recruitment quotas in non-university sectors	19	33.3	5
Incentives for firms to employ PhDs in R&D	18	31.6	6
Complementary training (digital, languages, entrepreneurship)	13	22.8	7
Psychological/professional support units in universities	13	22.8	7
University business incubators	12	21.1	9

Open-ended responses converged on the same priority: direct employment of PhD holders in the higher-education sector was the most frequent proposal (63.2%), followed by organizational/alternative employment mechanisms (19.3%), fairness and equal opportunity across specializations (10.5%), and expanding university positions according to actual need (7.0%).

Table 16. Open-Ended Responses on Additional Solutions

Additional proposed solution	n	%
Direct employment in higher education	36	63.2
Organizational/alternative employment mechanisms	11	19.3
Fairness and equal opportunity across specializations	6	10.5
Increase university positions per actual needs	4	7.0
Total	57	100.0

Regarding institutional responsibility, most respondents (64.9%) identified the Ministry of Higher Education and Scientific Research as primarily responsible, while 22.8% favored shared responsibility among stakeholders and 12.3% assigned responsibility to the local university (Table 17). Asked to identify the single most urgent solution, 47.4% chose direct employment/integration and 35.1% chose the registration-and-monitoring platform (Table 18), together pointing to two complementary levels of intervention: an urgent employment response and a proactive institutional/monitoring mechanism.

Table 17. Institution Considered Most Responsible

Responsible institution	n	%
Ministry of Higher Education & Scientific Research	37	64.9
Partnership among stakeholders	13	22.8
University (local level)	7	12.3
Total	57	100.0

Table 18. Most Urgent and Priority Solution

Most urgent solution	n	%	Rank
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Direct employment/integration of PhD holders	27	47.4	1
Registration/monitoring platform	20	35.1	2
Regulate doctoral education & positions per labor needs	6	10.5	3
Expand/create alternative employment opportunities	4	7.0	4
Total	57	100.0	—

Source (Tables 15–18): prepared by the author based on SPSS output.

7. Discussion

7.1 Interpretation of Findings in Light of Theory and Prior Research

The pattern of correlations obtained here is consistent with, and extends, the four theoretical frameworks mobilized in this study. The positive association between academic unemployment and emotional exhaustion (H1) aligns with meta-analytic evidence that prolonged unemployment erodes mental health cumulatively over time (Mackie & Bates, 2019) and with latent deprivation theory's account of the loss of time structure and regular activity that paid work otherwise provides (Jahoda, 1982); (Paul, Scholl, Moser, & Zechmann, 2023). The association between academic unemployment and depersonalization (H2) is compatible with a conservation-of-resources reading in which repeated, unsuccessful integration attempts progressively deplete an unemployed PhD holder's symbolic resources—scientific identity and sense of belonging—producing the defensive, cynical distancing from academia documented among early-career researchers facing weak institutional support (Cornér, Löfström, & Pyhältö, 2017); (Hobfoll & Freedy, 1993).

The strongest relationship observed, between academic unemployment and reduced personal accomplishment (H3, $r = .751$), is particularly informative when read through education-job mismatch theory: because a PhD represents one of the largest possible individual investments in human capital, the absence of any position in which to deploy that investment directly implicates the individual's sense of competence and achievement, consistent with the “human capital waste” literature (Becker, 1964); (Vancea, M & al, 2019). This ordering of effects—strongest for accomplishment, moderate for exhaustion and cynicism—suggests that, for this population, the professional-identity cost of unemployment (“what have my years of training amounted to?”) may be more acute than its purely energetic cost, a nuance that is easy to overlook when burnout is treated as a single undifferentiated construct.

The absence of significant differences by gender, discipline, or unemployment duration (H4 not supported) should be interpreted cautiously rather than as evidence that these variables are irrelevant. With $N = 57$ and burnout differences of only one to two points on the composite scale, the study may simply lack the statistical power to detect small-to-moderate effects; discipline-based differences documented elsewhere (Koutsimani, Montgomery, & Georganta, , 2019) may also be attenuated in a sample recruited from a single cross-disciplinary electronic network, where the shared experience of academic unemployment may outweigh discipline-specific dynamics. Likewise, the non-significant and counter-directional interaction term for social support (H5 not supported) does not necessarily contradict conservation-of-resources theory's general claim that social resources buffer stress (Zhang, Litson, & Feldon, 2022); it may instead indicate that, once a PhD holder's unemployment becomes chronic (as for the 73.7% of this sample unemployed one to three years), the specific resource that has been lost—professional status and identity—is not one that family or informal social support can readily replace. This is consistent with Career Construction Theory's emphasis on career adaptability,

rather than social support per se, as the more relevant adaptive resource for this population (Savickas, 2005).

7.2 Theoretical Implications

This study extends burnout research beyond its traditional human-service-profession focus (Maslach & Jackson, The measurement of experienced burnout, 1981); (Maslach, Schaufeli, & Leiter, Job burnout, 2001) to a post-graduation, non-employment context, showing that all three Maslach dimensions are empirically distinguishable and differentially related to academic unemployment even outside a workplace setting. It also demonstrates the value of jointly applying latent deprivation, conservation of resources, education-job mismatch, and career construction theories—frameworks more often applied separately—to explain a single phenomenon in a non-Western, Maghreb setting, addressing calls in the literature to examine post-graduation academic unemployment as analytically distinct from doctoral-training-phase stress (Devine & Hunter, 2017); (Martínez-García & al, 2024).

7.3 Practical Implications

For policymakers, the strong association with reduced personal accomplishment suggests that interventions limited to income support or short-term contracts are unlikely, by themselves, to address the psychological dimension of academic unemployment; measures that restore a sense of professional relevance and use of scientific competence—research contracts, affiliated-researcher status, involvement in real projects—are likely to matter as much as income. For universities, the finding that a considerable share of respondents (43.9%) had already sat for a non-PhD-level recruitment competition, primarily out of economic necessity, signals a widening gap between doctoral training and realistic employment pathways that institutions and ministries need to address directly rather than treat as an individual failure. These implications are developed into a concrete strategy in Section 8.

8. Proposed Strategy for Reducing Academic Unemployment among PhD Holders in Algeria

Building on the hypothesis-testing results and respondents' stated priorities, the study proposes a national strategy that shifts from temporary, reactive responses toward the proactive management of doctoral-level scientific competencies. The strategy integrates three complementary levels of intervention, summarized in Table 19.

The first, urgent level combines direct employment/integration measures—rated the most urgent solution by 47.4% of respondents—with a national platform to register and monitor unemployed PhD holders and connect them with employment opportunities, the single most supported mechanism overall (87.7%; 35.1% also rated it a top priority). The second, structural level aligns doctoral education with current and future labor-market needs and diversifies integration pathways beyond the university sector, consistent with respondent support for a university–industry “Bridge” mechanism (49.1%), non-university recruitment quotas (33.3%), and incentives for firms to employ PhD holders in R&D (31.6%). The third level ensures sustainability through continuous professional and psychological support and periodic monitoring of integration indicators—not as a substitute for employment, but as a means of reducing the psychological cost documented in Section 6, particularly the elevated reduced-personal-accomplishment scores. Consistent with respondents' own view that the Ministry of Higher Education and Scientific Research bears primary responsibility (64.9%), the strategy proposes ministry-led national leadership with participatory implementation involving universities, public-sector and economic institutions, and other stakeholders (22.8% favored an explicit multi-stakeholder partnership).

Table 19. Proposed National Strategy for Reducing Academic Unemployment among PhD Holders

Level	Proposed action	Responsible institution(s)	Priority
1. Registration & digitalization	Establish a national platform to register unemployed PhD holders, update their data, and connect them with opportunities	Ministry of Higher Education, with universities	Urgent
2. Employment & integration	Develop a national needs map and allocate positions by specialization/shortage; adopt temporary integration mechanisms where necessary	Ministry of Higher Education & public-sector institutions	Urgent
3. Training planning	Align number and specialization of PhD programs with current and future labor-market needs	Ministry of Higher Education & universities	Medium-term
4. Diversification of opportunities	Create pathways in public/economic institutions, R&D, international cooperation, and entrepreneurship	Government, economic sector, universities	Urgent/medium-term
5. University–industry linkage	Establish a “Bridge” mechanism linking labs with institutions for R&D and innovation projects	Universities & Ministry of Higher Education	Medium-term
6. Professional & psychological support	Provide career guidance, complementary training, and psychological support during unemployment and transition	Universities & specialized bodies	Continuous
7. Monitoring & evaluation	Track integration rates, unemployment duration, positions/projects created; periodically evaluate strategy impact	Ministry of Higher Education & universities	Continuous

Source: prepared by the author from the field-study findings.

9. Limitations and Future Research Directions

- The non-probability convenience sample (N = 57), drawn from a single electronic network, limits the generalizability of findings beyond similarly situated PhD holders; probability sampling across universities, disciplines, and regions is needed to assess the stability of these results.
- The cross-sectional design precludes causal inference; the observed correlations are consistent with, but do not prove, a causal path from academic unemployment to burnout. Longitudinal designs are needed to track this relationship over time.

- The non-significant findings for H4 and H5 may partly reflect limited statistical power at this sample size rather than the true absence of demographic or moderating effects; replication with larger samples is warranted.
- Reliance on self-report measures introduces the possibility of common-method variance and social-desirability bias.
- Future research should examine additional explanatory variables such as job security, psychological resilience, career satisfaction, and the quality (rather than mere presence) of social support, and should empirically evaluate the impact of the proposed strategy's employment, integration, and support components on reducing academic unemployment and burnout.

10. Conclusion

Academic unemployment among PhD holders extends beyond its professional and economic dimension to affect multiple psychological aspects, particularly under prolonged waiting periods and limited integration opportunities. This study found statistically significant positive relationships between academic unemployment and emotional exhaustion ($r = .496$), depersonalization ($r = .489$), and, most strongly, reduced personal accomplishment ($r = .751$), supporting H1–H3. No statistically significant differences in burnout emerged by gender, discipline, or unemployment duration, and perceived social support did not significantly moderate the academic unemployment–burnout relationship, so H4 and H5 were not supported; these null results should be interpreted with due caution given the sample size and should not be generalized beyond it.

Respondents expressed a clear preference for integration-, employment-, and monitoring-oriented solutions, led at the national level by the Ministry of Higher Education and Scientific Research in partnership with universities and other stakeholders. Building on these findings, the study proposes an integrated national strategy for managing PhD-level competencies—combining a national registration and monitoring platform, employment aligned with actual needs, doctoral-education planning aligned with labor-market requirements, diversified integration pathways beyond the university sector, university–industry partnerships in research and development, and sustained professional and psychological support. Ultimately, academic unemployment is not merely a gap between qualifications and employment opportunities but a challenge for the management of human and scientific capital; an effective response requires moving beyond a logic of waiting toward a proactive policy of competency management, so that the PhD becomes a resource serving the university, the economy, and national development rather than a pathway that ends, for some of its holders, in academic unemployment.

Declarations

Ethics approval and consent to participate

No formal approval was obtained from an institutional research ethics committee or the university for this study. The questionnaire was distributed electronically to members of the target group, and participation was entirely voluntary. Before completing the questionnaire, participants were informed about the purpose of the study and its scientific objective, namely to better understand the growing phenomenon of academic unemployment and to contribute to the development of practical solutions. The questionnaire was anonymous, and no personally identifiable information was collected. By voluntarily completing and submitting the questionnaire, participants indicated their willingness to participate in the study.

Consent for publication

Not applicable. The study does not report any individual identifiable information, images, or personal case details.

Availability of data and materials

The dataset supporting the findings of this study is available from the corresponding author upon reasonable request, subject to the protection of participants' confidentiality and anonymity.

Competing interests

The author declares that there are no competing interests related to this study.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author contributions

The author was responsible for the conceptualization and design of the study, development and administration of the questionnaire, data collection, statistical analysis, interpretation of the findings, and writing and revision of the manuscript.

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