

Article

Why Early Career Researchers Escape the Ivory Tower: The Role of Environmental Perception in Career Choices

Xinqiao Liu , Xinyuan Zhang and Yan Li

School of Education, Tianjin University, Tianjin 300350, China

* Correspondence: xinqiaoliu@pku.edu.cn

Abstract: As early career researchers, postdocs play an irreplaceable and crucial role in scientific research, especially in highly competitive fields. Given the importance of the postdoc community, it is essential to explore their engagement in the academic labor market. Employment in academic departments should be the ideal career choice for postdocs, but this is not always the case. In recent years, an increasing number of postdocs have chosen to leave the ivory tower, which is often the result of a dynamic integration of the work environment and individual cognition. This study is based on the public data from the “Nature 2023 Postdoc Survey” and empirically analyzes the predictive relationship between different dimensions of environmental perception and postdoc academic career choices, as well as whether there are differences in predictive relationships across various fields. Difference analysis suggested that males and those working in their native country tend to have greater satisfaction in their environment perception. Correlation analysis revealed that postdocs’ environmental perception is significantly and positively correlated with academic career choices. Regression results indicated that institutional environment, organizational environment, living environment, and support environment can all predict postdoc academic career choices, with significant disciplinary differences in these predictive effects. It is recommended that mental health, salary and benefits, job security, and professional training be focused on to improve the working environment for early career researchers. Additionally, it is necessary to increase inclusive support for vulnerable postdoc groups and enhance their expectations for academic careers.



Citation: Liu, X.; Zhang, X.; Li, Y. Why Early Career Researchers Escape the Ivory Tower: The Role of Environmental Perception in Career Choices. *Educ. Sci.* **2024**, *14*, 1333. <https://doi.org/10.3390/educsci14121333>

Academic Editor: Myint Swe Khine

Received: 27 October 2024

Revised: 29 November 2024

Accepted: 4 December 2024

Published: 6 December 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: environmental perception; SCC; academic career; disciplinary differences; career choice

1. Introduction

Postdoctoral researchers are an essential backbone of scientific research worldwide and an indispensable part of the academic community [1], widely recognized as important contributors to scientific and economic development [2]. At the same time, the postdoctoral position as a temporary job has gradually become the main choice for doctoral graduates transitioning to future permanent positions, whether in academic research institutions, businesses, or other organizations [3]. Typically, research-focused academic positions are the primary career goals and ideal career destinations for postdoctoral researchers [4]. They enhance their research skills and create new research outcomes to increase their competitiveness in obtaining positions within the academic community [5]. However, it is worth noting that in recent years, influenced by various factors, the postdoctoral community still faces many uncertainties in successfully obtaining their ideal academic positions, and their career choice intentions are in a state of dynamic flux, with high mobility tendencies and attrition rates in the academic field [6–8]. A postdoctoral survey conducted by the journal *Nature* in 2020 showed that more than half (56%) of respondents had a negative view of their career prospects, and less than half would recommend a research career to their younger selves [9]. A survey from the United States indicated that the proportion of biomedical postdocs who obtain tenured positions within 10 years is less than one-third, and more than one-third of them enter the corporate world [10]. Early career researchers

in Australia also face similar career choice dilemmas, with nearly one-third attempting to seek employment outside of research institutions [11].

Postdocs, as core participants and major contributors to scientific research, especially in highly competitive fields, have become the focus of global academic attention regarding their future career choices. Social Cognitive Career Theory (SCCT) [12] can provide a perspective for considering the academic career choice tendencies of postdocs [13–15]. It posits that although social and economic factors often intervene in the direction, level, and content of individuals' future career choices, academic experiences typically resonate with individuals' future careers. Academic environments tend to influence the balance and consistency that an individual could experience toward his or her major in real life, also known as professional identity, which is a significant factor affecting individual career adaptability and career development in any field [16]. Interests and skills cultivated in an academic setting, under ideal circumstances, can be transformed into individuals' career choices [12]. Therefore, the tendency of postdocs to choose academic careers is largely influenced by their perception of the complex environment [17,18]. Environment perception refers to an individual's awareness or feeling of the environment and includes behavior related to understanding and recognizing the environment through the senses. It also reflects the dynamic interaction between people and their environment [19]. Research has shown that research experience [20], research environment [21], interest in academic careers [22], and mentor behaviors [23] can all affect the mobility of early career researchers in the academic field. These factors can all be considered as individuals' perceptions of their work and living environments. For postdocs, comprehension and recognition of the internal and external environments will become crucial components of their career decision-making processes.

An increasing number of postdocs are inclined to leave academia, which not only deviates from the intended purpose of establishing postdoctoral positions but also leads to a significant waste of national educational investments. However, the existing literature pays little attention to this phenomenon. In light of this, this study adopts the perspective of the work environment and explores how postdocs' environmental perceptions affect their willingness to pursue academic careers. We also hope to enrich the literature in this field and provide some support to postdoc administrations in creating their environments, managing personnel, and developing and refining differentiated policies.

1.1. Literature Review

1.1.1. Environment Perception and Postdoctoral Academic Career Choices

Social cognitive career theory (SCCT) explains how certain behaviors are acquired and maintained through the interaction of personal, behavioral, and environmental factors [14]. The long-term academic experience in universities and research institutions occupies a significant period of life for postdoctoral researchers, so the academic environment will be integrated into the cognitive process of future academic career choices. Self-efficacy, which refers to an individual's belief or confidence in their ability to perform a specific behavior, can influence their career adaptability [18]. It has been shown that the self-efficacy of early career researchers is inextricably linked to the academic and external environments and profoundly influences their practice [24,25]. Furthermore, the environmental support perceived by postdocs is an essential element for academic career development and further influences career interests and goals, executive power, and professional performance, among other factors [12]. Negative perceptions of the external environment can weaken postdocs' interest and passion for academia, reducing the likelihood of them choosing to pursue academic careers in the future. In recent years, there has been a sharp increase in the number of academic researchers, yet the growth in the number of academic positions has been relatively slow. The discrepancy between the two has made it increasingly difficult for researchers to enter universities or research institutions for long-term academic research [26–28].

Moreover, the oversaturation of researchers has significantly diminished career development and promotion prospects for academic positions compared to the past [29–31]. Apart from the external labor market environment, postdocs' perception of the internal work environment is also a crucial factor influencing their ability to enter academia. A realistic conceptualization of career decision-making requires individuals to integrate the ever-changing work environment with evolving structures of knowledge and individual backgrounds [32]. The temporary and challenging work environment may lead to a sense of insecurity among postdocs and affect their cognition, emotion, and evaluation of academic careers, causing fluctuations in their willingness to develop professionally and their career decisions [4].

Researchers have actively explored the relationship between the work environment and postdocs' academic career choices. A harsh working environment can reduce postdoctoral scholars' passion for their academic careers [33], diminish their academic professional identity, and potentially lower their willingness to continue working in academia in normal circumstances. In other words, environmental factors and environmental perceptions can affect future academic career decision-making. An empirical analysis of postdoctoral researchers in the United States revealed a positive correlation between career preparation perception, mentor support perception, and academic career development [34]. A survey of postdoctoral researchers in Australia showed that the relationship between mentors and postdocs substantially affects researchers' experiences and productivity, and perceived satisfaction with mentor support substantially influences their future career choices [35]. Research on postdoctoral academic career perseverance confirms that the postdoctoral professional decision-making process is ongoing and complex, with two major influencing factors: personal interest/values and lifestyle/work balance [36], both of which are inseparable from the construction of a supportive work environment and atmosphere.

Whether psychological needs are met during research assignments can have a significant impact on postdoctoral academic career choices. For example, research has shown that the temporariness of postdoctoral work often leads to a lack of autonomy [11], resulting in marginalized self-perception, which is extremely detrimental to future academic career development. In addition, the insecurity caused by a fragmented career path [37], whether academic research can bring a sense of accomplishment and satisfaction [11], the ability to improve self-efficacy [38], and other factors are also considered in the postdoctoral career choice process. Qualitative analysis of postdoctoral persistence in academia indicates that although individual factors such as academic passion are necessary for career perseverance, financial insecurity, work–life balance, obtaining funding, academic politics, and a competitive job market pose challenges to the persistence of an academic career [39]. In summary, the factors influencing postdocs' willingness to pursue an academic career are numerous and complex, but one can start from the modifiable aspect of the working environment. For example, we can improve postdocs' self-efficacy, professional interests and goals, executive power and professional performance by expanding the environmental support system [40], strengthening the environmental guarantees for career development, and alleviating the pressures of academic career development [12]. Ultimately, this will improve postdocs' environmental perception effectively and contribute to a sustainable academic ecology [41].

1.1.2. Individual Background and Postdoctoral Academic Career Choices

According to SCCT, individuals with different backgrounds (such as gender, culture, and socioeconomic status) may develop differentiated cognitions in the same environment, which may then lead to differences in academic career choice intentions and preferences [42–44]. Demographic factors such as gender and ethnicity may be important variables influencing postdocs' willingness to develop an academic career, with research indicating that postdocs from minority ethnic groups lack confidence in pursuing careers in academia, as well as knowledge and skills, thus facing greater challenges [45]. Surveys from the United States indicate a declining interest among postdoctoral groups from diverse social backgrounds in pursuing an academic career, with differences in the scale and

timing of such changes across different genders and races/ethnicities [46]. Other studies have found that although women who enter postdoctoral work have a greater intention to pursue academic careers in the future, they often face a dilemma between establishing and managing a family and developing an academic career [47,48], generally showing lower levels compared to men in securing tenure-track academic positions [37], elite university positions, and persistence in academic careers [49,50]. A survey conducted in the United States in 2016 involving 7603 postdocs also confirmed that women face more difficulties and poorer treatment at work but pointed out that male postdocs and non-American citizen postdocs are more interested in academic positions [34]; hence, there is currently no broad consensus on the gender differences in academic career choice intentions. However, to address the influence of gender differences on academic career intentions, one needs to consider different cultural backgrounds, labor statuses and divisions of labor, as well as the specific circumstances of individuals and families [51].

Regarding the differences caused in disciplinary fields, a study from the Netherlands showed that uncertainties in future career development affect the environmental experience and satisfaction of postdoctoral work, with this negative impact being even more evident for individuals in the social sciences and humanities [52]. As disciplinary barriers continue to be broken down and interdisciplinary and cross-disciplinary fields emerge, the academic career development of postdocs may also differ from that of disciplines. S&E postdocs are more dependent on hardware facilities such as laboratories and research teams than those in the humanities and social sciences. Their research training mode, career development trajectory and career salary are all very different from those of postdocs in humanities [53]. The majority of traditional postdoctoral research has focused on the biomedical field [54–56], which is determined by the nature of biological and medical disciplines and the requirements for professional development in these fields. Research indicates that interest in academic careers at research universities has significantly declined among postdocs in the biomedical and STEM fields, while interest in non-research careers has increased [57,58]. The different cultural constructions and the distinctive characteristics of disciplinary knowledge mean that postdocs from different disciplines may have different perceptions of their environment, and the varying attributes of scientific research may lead to differences in how various disciplines depend on the work environment. Hence, we hypothesize that the relationship between environmental perception and academic career choice might also differ across disciplines.

1.2. The Current Study

The present study aims to explore the relationship between environmental perception and postdoctoral academic career choice. Compared with the literature, our study attempts to expand in the following areas. First, this study addresses the lack of research on postdocs, as most of the existing studies focus on doctoral students in terms of academic career choice and development [59]. Second, after integrating the literature, we systematically explore the heterogeneity of postdocs based on individual background variables such as gender, age, work field, and the country in which the postdocs are working, making the research conclusions and recommendations more targeted and helpful for relevant departments to provide more specific and effective academic career development support for minority and disadvantaged groups. Third, the study expands the understanding of environmental perception by not only focusing on postdoctoral satisfaction with mentor guidance, work–life balance, and funding support but also incorporating persistent factors such as professional development support and psychological health support into the analysis. Finally, our conclusions will enrich the literature on postdoctoral environment perceptions and academic career choices and provide more empirical evidence for improving their working conditions. Based on the literature and theory, the present study proposes the following hypotheses:

Hypothesis 1: *Individual background differences may lead to variations in environmental perception.*

Hypothesis 2: *Environmental perception positively predicts postdoctoral academic career choice.*

Hypothesis 3: *The predictive relationship between environmental perceptions and postdoctoral academic career choices varies by discipline.*

2. Materials and Methods

2.1. Participants

The data are from the “Nature 2023 Postdoc Survey”. Following the global postdoc survey conducted in 2020, the journal *Nature* carried out its second survey in June 2023, with a focus on the experiences of postdoctoral researchers, as this group is often considered the “overlooked part of the scientific workforce”. The survey collected information on postdocs’ personal backgrounds, career development, working environments, and organizational structures online by distributing a questionnaire via *Nature*’s database and to its subscribers. The questionnaire was available in English, Mandarin, and Spanish versions, effectively mitigating the problem of insufficient sample representativeness from specific regions. During the seven-week survey period, a total of 6571 respondents from 93 countries participated, resulting in 3838 valid samples. Among the 3838 participants, 1938 were women (52%), 3286 were aged under 40 (86%), 1052 belonged to a minority ethnic group in their respective countries (28%), 2304 were working outside their native countries (61%), 1846 had been working as postdocs for no more than 2 years (48%), and 4% were engaged in postdoctoral work outside of universities/research institutions [60–62].

2.2. Methods

Environment perception: Environment perception consisted of a total of 25 items, and respondents were asked to self-report their perceptions of their working environment. Through factor analysis, this study extracted four common factors within the environmental perception variable, suggesting that environmental perception contains four dimensions.

Dimension 1: Institutional environment. This measures the effectiveness of institutional construction and the cultural atmosphere of the working environment where the postdoc works, including 10 items such as “opportunities to engage in interesting projects”, “interest in work”, “sense of achievement”, “relationships with colleagues”, and “sense of safety in the work environment/place”.

Dimension 2: Organizational environment. This measures the service and long-term development capability of the organization, including five items such as “adequate psychological health support”, “suitable services for mental health and well-being”, “level of support from superiors”, “organizational management and leadership”, and “organization’s commitment to diversity and an inclusive workplace”.

Dimension 3: Living environment. This measures the balance and allocation of time between work and life, including five items such as “total working hours”, “work–life balance”, “culture of long-term overtime”, “organizational support for work–life balance”, and “duration of research time”.

Dimension 4: Support environment. This measures the prospects for promotion and development support, including five items such as “availability of funds”, “welfare levels”, “salary compensation”, “opportunities for promotion”, and “job security”.

The 25 items in the four dimensions use a seven-point Likert scale, with 1–7 points representing “very dissatisfied” to “very satisfied”, respectively. Each dimension is measured by an average score to assess the quality of postdoctoral environment perception, with higher scores indicating greater satisfaction with the work environment. The Cronbach’s alpha for environment perception was 0.930, indicating high reliability.

Academic career choice: Academic career choice was measured by the plan for future career development among respondents. Participants were required to answer, “In which

sector do you plan to base your career?’. The response options for this question were divided into a dichotomous variable (academia or not), with 0 representing non-academic careers and 1 representing academic careers. The outcome of these items represents the participants’ willingness to pursue an academic career in the future.

Individual background variables: Individual background variables include gender, age, whether a postdoc was in one’s native country, postdoctoral work field, and current place of residence. Among these variables, gender was transformed into a dichotomous variable in the analysis, with 0 = female and 1 = male. For age, the sample was divided into five groups based on age: 1 = 22–25 years; 2 = 26–30 years; 3 = 31–40 years; 4 = 41–50 years; and 5 = 51–60 years. The presence of a postdoc in their native country was also coded as a dichotomous variable for analysis, with 0 = in the native country and 1 = not in the native country. The postdoctoral work field is measured as follows: 1 = Agriculture and food; 2 = Astronomy and planetary; 3 = Biomedical and clinical; 4 = Chemistry; 5 = Computer and mathematics; 6 = Ecology and evolution; 7 = Engineering; 8 = Geology and environmental; 9 = Health care; 10 = Other science-related field; 11 = Physics; 12 = Social sciences. For the current place of residence, participants were to choose from Africa, Asia (including the Middle East), Australasia, Europe, North or Central America, and South America.

2.3. Data Analysis

We used SPSS 28.0 and Stata 15.0 software for the data analysis. First, we conducted a factor analysis for all the questions on environment perception using SPSS 28.0, dividing environmental perception into different dimensions and determining the specific content of different dimensions based on the measurement items. Then, we employed Stata 15.0 to carry out descriptive statistical analysis for the core variables, which allowed us to form a preliminary general understanding of the level of environment perception among the postdoctoral group. Afterward, the study analyzed the correlations between the different dimensions of environmental perception and postdoctoral academic career choices and used *t*-tests to verify whether there were differences in environmental perception based on individual background variables. Then, we employed logistic regression models to empirically explore the predictive relationship between perceived environmental satisfaction and academic career choice, where five predictive models were used to examine the impact of different types of environmental perception as well as overall environmental perception on postdoctoral academic career choice. According to suggestions from related literature, we finally used logistic regression models to analyze whether there were differences in the predictive role of environmental perception among postdocs in the sciences, engineering, and humanities. All logistic regression models incorporated control variables such as gender, age, and the workplace of the postdocs into the analysis process, enhancing the credibility and robustness of the results (Figure 1).

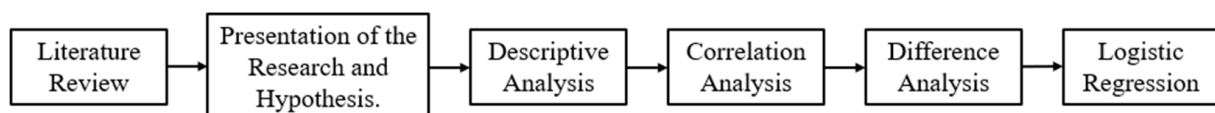


Figure 1. Research process.

3. Results

3.1. Descriptive and Correlation Analysis

Table 1 presents the descriptive statistics and correlation analysis results. The respondents scored the highest in the dimension of institutional environment perception, with an average of 4.866, followed by living environment perception, which scored 4.205; the score for supportive environment perception was the lowest among the four dimensions, with a score of 3.725. Overall, postdoctoral work units have higher overall construction levels in the institutional environment and living environment, while the organizational environment and support environment require improvement.

Table 1. Descriptive statistics and correlations of the core variables.

Variables		Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Academic career choice		0.637	0.481	1							
Environmental perception	(2) Institutional environment	4.866	1.257	0.131 ***	1						
	(3) Organizational environment	3.838	1.469	0.074 ***	0.653 ***	1					
	(4) Living environment	4.205	1.368	0.041 **	0.574 ***	0.540 ***	1				
	(5) Support environment	3.725	1.334	0.094 ***	0.573 ***	0.541 ***	0.518 ***	1			
(6) Gender		0.483	0.500	0.053 ***	0.016	0.085 ***	0.025	0.033 **	1		
(7) Age		2.948	0.641	0.060 ***	−0.128 ***	−0.054 ***	−0.101 ***	−0.148 ***	0.045 ***	1	
(8) Whether undertaking a postdoc in native country		0.612	0.487	−0.055 ***	−0.066 ***	0.026	0.003	−0.018	0.042 **	−0.007	1

Note: ** $p < 0.05$, *** $p < 0.01$, SD—standard deviation.

The correlation analysis shows that each dimension of environment perception is significantly and positively correlated with academic career choice; the better the work environment and satisfaction with the perception of the environment, the stronger the willingness to choose an academic career. Specifically, the institutional environment had a greater correlation coefficient effect on academic career choice ($p < 0.01$), while the living environment had a smaller correlation coefficient effect on academic career choice ($p < 0.05$). Additionally, gender, age, and whether a postdoc is in their native country are significantly correlated with academic career choice ($p < 0.01$); in other words, males, older individuals, and postdocs conducting research in their native country are more likely to choose an academic career.

3.2. Differences Test Across Groups

Considering that there may be internal heterogeneity in the postdocs' perceptions of the environment, this study conducted a differential test for gender, whether in the native country or in work fields, as three individual background variables, with the results detailed in Table 2. First, the perception of the environment among postdocs may vary by gender, with males perceiving a better organizational environment than females (3.982 vs. 3.733, $p < 0.01$); similarly, males also have a better perception of the supportive environment (3.780 vs. 3.691, $p < 0.05$). Second, whether postdocs are in their native country significantly affects their perception of the institutional environment, with participants who conduct postdoctoral research in their native country having a better perception of the institutional environment (4.970 vs. 4.800, $p < 0.01$).

It is noteworthy that postdocs working in different disciplines perceive significant differences ($p < 0.01$) in institutional environment, organizational environment, living environment, and support environment. In the organizational environment dimension, postdocs working in the fields of agriculture and food (4.155), engineering (4.099), health care (4.094), and computer and mathematics (4.038) have better perceptions. In the living environment dimension, those working in ecology and evolution (4.512), social sciences (4.511), and computer and mathematics (4.462) have more favorable perceptions. In the support environment dimension, better perceptions are found among postdocs in computer and mathematics (4.000), social sciences (3.945), engineering (3.897), and other such fields. Overall, the participants in computer and mathematics, engineering, and social sciences tended to have a more positive evaluation of their working environments. Similarly, it is important to pay special attention to fields with lower scores, such as those in astronomy and planetary environments, which rate the organizational environment (3.627) and living environment (4.077) lower; those in biomedical and clinical environments, which score the living environment (4.079) and support environment (3.634) lower; and those in health

care, which also score lower in the living environment (4.162) and support environment (3.740), indicating that postdocs in these three fields may have a poorer perception of their work environment.

Table 2. Differences in environment perceptions across individual background variables.

		Institutional Environment			Organizational Environment			Living Environment			Support Environment		
		Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>	Mean	SD	<i>p</i>
Gender	Female	4.857	0.029	0.341	3.733	0.034	0.000	4.182	0.031	0.137	3.691	0.030	0.044
	Male	4.897	0.030		3.982	0.035		4.249	0.032		3.780	0.032	
Whether in native country	In native country	4.970	0.032	0.000	3.791	0.038	0.117	4.199	0.035	0.832	3.756	0.035	0.268
	Not in native country	4.800	0.027		3.868	0.031		4.209	0.029		3.706	0.028	
Work field	Agriculture and food	4.868	1.369	0.241	4.155	1.538	0.000	4.382	1.261	0.000	3.773	1.382	0.004
	Astronomy and planetary	4.825	1.321		3.627	1.648		4.077	1.499		3.765	1.383	
	Biomedical and clinical	4.820	1.251		3.758	1.450		4.079	1.354		3.634	1.323	
	Chemistry	4.850	1.318		3.963	1.495		4.162	1.523		3.883	1.410	
	Computer and mathematics	5.076	1.259		4.038	1.479		4.462	1.264		4.000	1.351	
	Ecology and evolution	4.910	1.189		3.542	1.273		4.512	1.281		3.771	1.289	
	Engineering	4.955	1.380		4.099	1.591		4.196	1.513		3.897	1.474	
	Geology and environmental	4.981	1.157		3.922	1.400		4.436	1.354		3.868	1.225	
	Health care	4.835	1.310		4.094	1.523		4.162	1.370		3.740	1.354	
	Other science-related field	4.876	1.241		3.952	1.541		4.369	1.323		3.656	1.320	
	Physics	4.838	1.290		3.782	1.525		4.351	1.332		3.840	1.297	
	Social sciences	5.110	1.038		3.912	1.367		4.511	1.345		3.945	1.245	

In summary, the results demonstrate that there is a significant positive correlation between environmental perception and postdoctoral academic career choice and that individual background differences may lead to variations in environmental perception; therefore, Hypothesis 1 is confirmed.

3.3. The Predictive Effect of Environment Perception

3.3.1. Predictors of Academic Career Choice

Table 3 presents the regression test results of environment perception on postdoc-toral academic career choice. Model 1 is the regression model of institutional environment perception and academic career choice, showing that the institutional environment is a significantly positive predictor of postdoctoral academic career choice (OR = 1.253, $p < 0.01$). Specifically, for every one-point increase in the institutional environment score, the likelihood of postdocs choosing an academic career increases by 25.3%, with those having a better and stronger perception of the institutional environment being more likely to choose an academic career. Additionally, gender significantly predicts academic career choice (OR = 1.221, $p < 0.01$), with men being more inclined to choose an academic career. Age also significantly predicts career choice (OR = 1.251, $p < 0.01$), with the possibility of choosing an academic career increasing by 25.1% with each higher age bracket.

Table 3. Regression analysis of environment perception and academic career choice.

	Model 1	Model 2	Model 3	Model 4	Model 5
Institutional environment	1.253 *** (0.036)				1.290 *** (0.054)
Organizational environment		1.115 *** (0.027)			0.975 (0.034)
Living environment			1.056 ** (0.028)		0.892 *** (0.031)
Support environment				1.180 *** (0.032)	1.111 *** (0.039)
Gender	1.221 *** (0.089)	1.209 *** (0.088)	1.235 *** (0.090)	1.228 *** (0.090)	1.228 *** (0.090)
Age	1.251 *** (0.075)	1.192 *** (0.071)	1.183 *** (0.070)	1.246 *** (0.075)	1.272 *** (0.077)
Whether in native country	0.873 * (0.066)	0.824 ** (0.062)	0.839 ** (0.063)	0.843 ** (0.063)	0.883 (0.067)
Intercept	0.319 (0.125)	0.706 (0.263)	0.906 (0.341)	0.533 (0.201)	0.323 (0.129)
Work field	yes	yes	yes	yes	yes
Current address	yes	yes	yes	yes	yes
Number of observations	3623	3623	3625	3622	3620
R ²	0.039	0.030	0.027	0.034	0.043

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The OR values are in the table, and standard deviations are in parentheses.

Model 2 is the regression model of organizational environment perception and academic career choice, demonstrating that the organizational environment is a significantly positive predictor of postdoctoral academic career choice (OR = 1.115, $p < 0.01$). With each one-point increase in the organizational environment score, the likelihood of choosing an academic career increases by 11.5%, with a better perception of the organizational environment increasing the likelihood of choosing an academic career. Similar to Model 1, postdocs who are male ($p < 0.01$), older ($p < 0.01$), or conducting research in their native country ($p < 0.05$) are more inclined to choose an academic career.

Model 3 is the regression model of living environment perception and academic career choice, indicating that the living environment is a significantly positive predictor of postdoctoral academic career choice (OR = 1.056, $p < 0.05$). With each one-point increase in the living environment score, the chance of choosing an academic career will increase by 5.6%, and a better perception of the living environment will make an academic career more likely. Furthermore, postdocs who are male ($p < 0.01$), older ($p < 0.01$), or conducting research in their native country ($p < 0.05$) lean toward choosing an academic career.

Model 4 is the regression model of support environment perception and academic career choice, and the results show that the support environment is a significantly positive predictor of postdoctoral academic career choice (OR = 1.180, $p < 0.01$). Specifically, for every 1-point increase in the self-assessment of the support environment, the probability of choosing an academic career increases by 18.0%, and postdocs with a better perception of the supportive environment are more likely to choose an academic career in the future. Similar to the results of Model 3, postdocs who are male ($p < 0.01$), older ($p < 0.01$), or conducting research in their native country ($p < 0.05$) are more inclined to choose an academic career.

Model 5 simultaneously incorporates institutional environment perception, organizational environment perception, living environment perception, and support environment perception as independent variables in the regression model. In this model, both the institutional environment (OR = 1.290, $p < 0.01$) and the supportive environment (OR = 1.111, $p < 0.01$) are still significantly positive predictors for postdocs entering academic careers. However, when the other environment perception scores are controlled, a better perception of the living environment actually lowers the willingness of postdocs to enter an academic career (OR = 0.892, $p < 0.01$), and the organizational environment

does not have a significant predictive effect on postdoctoral academic career choice. Similarly, men ($p < 0.01$) and older individuals ($p < 0.01$) are more inclined to choose an academic career.

In conclusion, the study confirms that environment perception has a significant positive predictive effect on postdoctoral academic career choice and that individual background variables such as gender, age, and country of work partly predict post-doctoral academic career choices, thus confirming Hypothesis 2.

3.3.2. Differences Between Disciplines

The study further divided a subset of the sample according to the “disciplinary field of work” into three broad categories, “Engineering, Sciences, Humanities”, and then explored the differences among the three disciplines in terms of the predictive effect of environment perception on academic career choice (Table 4). The results indicate that for postdocs in engineering, environment perception is a significantly positive predictor of future academic career choices. Specifically, for each one-point increase in the institutional environment score ($OR = 1.335$, $p < 0.01$), the probability of choosing an academic career increases by 33.5%, and for each one-point increase in the supportive environment score ($OR = 1.099$, $p < 0.05$), the probability of choosing an academic career increases by 9.9%. Superior institutional and supportive environments encourage postdocs in engineering to pursue work in the academic field. Additionally, postdocs who are older ($p < 0.01$) or who are conducting postdoctoral research in their native country ($p < 0.05$) have a stronger intention to enter academic careers in the future.

Table 4. Different predictive relationships from different disciplines.

	Engineering	Science	Humanities
Institutional environment	1.335 *** (0.068)	1.363 *** (0.141)	0.706 (0.217)
Organizational environment	0.987 (0.043)	0.877 (0.078)	1.025 (0.212)
Living environment	0.883 *** (0.038)	0.852 * (0.071)	1.185 (0.218)
Support environment	1.099 ** (0.047)	1.196 ** (0.108)	1.266 (0.279)
Gender	1.189 * (0.107)	1.104 (0.203)	1.931 (0.899)
Age	1.329 *** (0.106)	1.245 (0.184)	1.229 (0.421)
Whether in native country	0.825 ** (0.079)	1.000 (0.191)	1.489 (0.649)
Intercept	0.285 (0.134)	1.579 (1.973)	1.340 (2.248)
Current address	yes	yes	yes
Number of observations	2229	631	152
R ²	0.033	0.042	0.054

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The OR values are in the table, and standard deviations are in parentheses.

The impact of environmental perception on postdocs in the sciences is similar to that on postdocs in engineering, with both institutional and support environments being significantly positive predictors of entry into academic careers. For every one-point increase in the institutional environment score ($OR = 1.363$, $p < 0.01$), the likelihood of choosing an academic career increases by 36.3%, and for the support environment ($OR = 1.196$, $p < 0.05$), the likelihood increases by 19.6%. In addition, other factors do not predict academic career choices among postdocs in the sciences. However, for postdocs in the humanities, environment perception, gender, age, and location of postdoctoral work do not predict academic career choices.

In conclusion, institutional and supportive environments significantly and positively predict academic career choices for postdocs in engineering and sciences, but this effect is not significant in the humanities. Thus, Hypothesis 3 is confirmed. All three hypotheses are accepted (Table 5).

Table 5. Acceptance and rejection of hypotheses.

Hypotheses	Acceptance	Rejection
Hypothesis 1	Yes	
Hypothesis 2	Yes	
Hypothesis 3	Yes	

4. Discussion

Previous surveys and research have shown that postdocs face significant career development challenges and difficulties, and they perceive the prospects for academic career development to be very pessimistic [26,27,29–31], with a tendency and inclination to move toward non-academic institutions [6–9]. The loss of high-quality research personnel from the academic field may have a negative impact on technological progress, economic construction, and social development [63,64] and is also not conducive to the realization of researchers' academic career ideals or the enhancement of self-efficacy. Thus, exploring the factors affecting postdoctoral academic career choices is necessary. This study confirms that postdocs' perceptions of their environment significantly and positively predict their willingness to enter academic careers in the future, which plays a very important role in designing more effective career development and support programs to improve postdocs' professional identity. Furthermore, this finding can provide theoretical support for reducing the loss of high-quality human resources and also has important practical implications for national-level research and economic development.

First, descriptive and correlation analysis revealed that institutional and living environments are relatively developed, but organizational and support environments are somewhat lacking. Deficits in these environments are associated with an imbalance in the supply and demand structure of the postdoctoral group [65,66]. With an increasing number of scholars choosing to enter transitory postdoctoral positions, there has been heightened competition among postdocs, a decrease in job security, and a decrease in salaries that are below expectations [39]. Our conclusions resonate with prior research on the developmental difficulties of postdoctoral work [26,27,67], confirming that research institutions need to strengthen environmental constructs in areas such as mental health, salary and benefits, and job security [11,37,38,68].

Second, the results validate the significant positive correlation between environmental perception and postdoctoral academic career choice and confirm the importance of environmental factors in career decision-making, as proposed in social cognitive career theory [13–15]. Postdoctoral career decision-making is often in a state of dynamic adjustment, requiring the integration of constantly changing environmental factors into the understanding and evaluation of career development. Therefore, their environmental perceptions are strongly linked to their willingness to pursue academic career development. Moreover, individual factors are significantly related to whether postdocs who choose academic careers, who are men, who are older, and who are conducting postdoctoral research in their native country are more likely to choose an academic career. Research on gender differences validates the “discrimination” and difficulties encountered by women in academic career development, as pointed out in previous studies [37,47–50]. We believe that men often have advantages over women in terms of academic career choices and development [37,47], and older individuals may have more academic achievements and greater expectations for pursuing an academic profession, which may account for their greater satisfaction with environmental perceptions.

Third, the differential analysis revealed that variations in individual backgrounds may lead to differences in environmental perception. In terms of gender, men's naturally

advantaged position in academic research may lead them to make relatively optimistic assessments of environmental conditions; this also explains the conclusion drawn in previous studies that men have a stronger intention to pursue academic careers [34]. In addition, previous research has scarcely focused on the experiences of non-native researchers regarding environmental perception and academic career development. Our study fills this gap, suggesting that postdocs working in their native country may have better cultural adaptations and, therefore, better environmental perceptions than non-native researchers [69]. At the level of disciplinary work fields, we found that participants in computer science and mathematics, engineering, and social sciences tended to have a more positive evaluation of their working environment. We believe that these disciplines are more closely linked to technology, economy, and politics, with a greater societal demand for high-level researchers within these fields, resulting in relatively mature institutional systems for postdoctoral training and potentially better environmental construction. In sum, while previous research has focused more on the heterogeneity in career choices among postdocs, our study pays closer attention to the individual experiences of postdoctoral groups, expanding research on disparities at the level of environmental perception. This finding reminds us to increase inclusive support for women and non-native (those working in a non-native country) postdocs to improve their perception of the environment [70,71].

Finally, regression results showed that institutional environment, organizational environment, living environment, and support environment can all positively predict postdocs' academic career choices, and there are significant disciplinary differences in these predictive relationships. The impact of environmental perception on postdoctoral academic career choices is consistent with findings in previous studies [11,33,34,37,65,66]. For postdocs, better satisfaction with environmental perception suggests more comprehensive support from mentors, organizations, and institutions [35,36,40], and they are more likely to achieve a wealth of research outcomes, which will effectively increase their academic confidence and enthusiasm and increase their willingness and expectations to engage in a long-term academic career.

Additionally, we found that institutional and support environments have a more pronounced predictive effect on academic career choices for postdocs in science and engineering. For this group, research and work are highly dependent on environmental support, such as mentor guidance and laboratory equipment, and they have greater demands for benefits, development opportunities, and research autonomy; therefore, environmental perception largely affects their subsequent career development. However, for postdocs in the humanities, environment perception did not have a significant impact on their desire to choose an academic career. According to previous research [52], uncertainty about future academic career development is likely to be a key factor hindering the willingness to choose and develop academic careers among humanities postdocs. Interventions can start from this point, focus on the diversity of career choices and professional training [37,72], and strive to enhance the sense of career security and expectations for humanities postdocs.

5. Limitations

First, the data were derived from subscribers related to the journal *Nature* and its database. Influenced by the publication's thematic preferences, the sample of postdocs in humanities and social sciences is insufficient, which might weaken the representativeness of the study. Future research will attempt to expand the sample to a wider range of humanities and social science journals and consider the use of multiple data sources to capture a more diverse group of postdocs.

Second, the measurement of environmental perception in the study was conducted through self-reports by the respondents. Although it captured individual experiences, it may not represent the actual construction of related work environments. Follow-up studies could introduce other data sources for validation.

Third, social and cultural differences could lead to variations in environmental cognition and career choices. The research sample was drawn from countries around the world

without an in-depth analysis focused on specific national cultural backgrounds. Future research may narrow its perspective and scope to improve the reliability of the results.

Fourth, the detection of the predictive relationship between environmental perception and postdoctoral academic career choice used cross-sectional data from a single period. Subsequent studies can utilize data from multiple time points to enhance the scientific validity of the predictions.

6. Conclusions

First, the institutional and living environments are relatively developed among the postdoc sample, but the organizational environment and supportive environment development are relatively insufficient.

Second, there is a significant positive correlation between environment perception and academic career choice in postdocs. Additionally, there are differences in environmental perception due to different individual backgrounds, with women and non-native researchers having a worse perception of the work environment.

Third, institutional environment, organizational environment, living environment, and support environment all positively predict a postdoc's academic career choice, but these predictive relationships are not significant for postdocs in the humanities; thus, there are significant differences among the disciplines.

It is noted that effective interventions to optimize postdocs' perceived satisfaction with the work environment are necessary to enhance their willingness to make academic career choices. Postdocs themselves need to improve their academic literacy to maximize their research potential and career opportunities.

Author Contributions: Conceptualization, X.L. and X.Z.; methodology, X.L.; formal analysis, Y.L.; investigation, Y.L.; writing—original draft preparation, Y.L., X.L. and X.Z.; writing—review and editing, Y.L., X.L. and X.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This study was funded by General Project for Humanities and Social Sciences Research of the Ministry of Education of China, entitled “Research on the Constituent Elements, Development Trajectories, and Enhancement Paths of Digital Literacy for Future Outstanding Engineering Talents” (Project Number: 24YJCZH187).

Institutional Review Board Statement: The data is a publicly available dataset that does not include any identifiers that can recognize personal information.

Informed Consent Statement: Informed consent was obtained from all the subjects involved in the study.

Data Availability Statement: The data used in this study were obtained from the following website: <https://doi.org/10.6084/m9.figshare.24236875.v1> (accessed on 2 January 2024).

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Felisberti, F.M.; Sear, R. Postdoctoral Researchers in the UK: A Snapshot at Factors Affecting Their Research Output. *PLoS ONE* **2014**, *9*, e93890. [CrossRef] [PubMed]
2. Sun, T.; Drane, D.; McGee, R.; Campa, H., III; Goldberg, B.B.; Hokanson, S.C. A national professional development program fills mentoring gaps for postdoctoral researchers. *PLoS ONE* **2023**, *18*, e0275767.
3. Shen, W.Q.; Gao, Y.; Zhang, B.; Jiang, J. Academia or enterprises: Gender, research outputs, and employment among PhD graduates in China. *Asia Pac. Educ. Rev.* **2018**, *19*, 285–296.
4. Blackford, S. Harnessing the power of communities: Career networking strategies for bioscience PhD students and postdoctoral researchers. *FEMS Microbiol. Lett.* **2018**, *365*, fny033. [CrossRef]
5. McWhinnie, S. *Mapping the Future: Survey of Chemistry and Physics Postdoctoral Researchers' Experiences and Career Intentions*; Diversity Team, IOP Institute of Physics: London, UK, 2011.
6. Guidetti, G.; Converso, D.; Di Fiore, T.; Viotti, S. Cynicism and dedication to work in post-docs: Relationships between individual job insecurity, job insecurity climate, and supervisor support. *Eur. J. High. Educ.* **2022**, *12*, 134–152. [CrossRef]
7. Dorenkamp, I.; Weiss, E.E. What makes them leave? A path model of postdocs' intentions to leave academia. *High. Educ.* **2018**, *75*, 747–767. [CrossRef]

8. Sills, J.; Ahmed, M.A.; Behbahani, A.H.; Brückner, A.; Charpentier, C.J.; Morais, L.H.; Mallory, S.; Pool, A.-H. The precarious position of postdocs during COVID-19. *Science* **2020**, *368*, 957–958.
9. Woolston, C. Postdoc survey reveals disenchantment with working life. *Nature* **2020**, *587*, 505–509. [[CrossRef](#)]
10. Kahn, S.; Ginther, D.K. The impact of postdoctoral training on early careers in biomedicine. *Nat. Biotechnol.* **2017**, *35*, 90–94. [[CrossRef](#)]
11. Petersen, E.B. Staying or going?: Australian early career researchers' narratives of academic work, exit options and coping strategies. *Aust. Univ. Rev.* **2011**, *53*, 34–42.
12. Lent, R.W.; Brown, S.D.; Hackett, G. Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *J. Vocat. Behav.* **1994**, *45*, 79–122. [[CrossRef](#)]
13. Schaub, M.; Tokar, D.M. The role of personality and learning experiences in social cognitive career theory. *J. Vocat. Behav.* **2005**, *66*, 304–325. [[CrossRef](#)]
14. Lent, R.W.; Lopez, A.M.; Lopez, F.G.; Sheu, H.-B. Social cognitive career theory and the prediction of interests and choice goals in the computing disciplines. *J. Vocat. Behav.* **2008**, *73*, 52–62. [[CrossRef](#)]
15. Sheu, H.-B.; Lent, R.W.; Brown, S.D.; Miller, M.J.; Hennessy, K.D.; Duffy, R.D. Testing the choice model of social cognitive career theory across Holland themes: A meta-analytic path analysis. *J. Vocat. Behav.* **2010**, *76*, 252–264. [[CrossRef](#)]
16. Liu, X.Q.; Ji, X.Y.; Zhang, Y.F.; Gao, W.J. Professional Identity and Career Adaptability among Chinese Engineering Students: The Mediating Role of Learning Engagement. *Behav. Sci.* **2023**, *13*, 480. [[CrossRef](#)]
17. Shen, W.; Xu, D. Excellent Adventurers: An Analysis of Career Choice and Path of Chinese Postdoctoral Researchers. *China High. Educ. Res.* **2021**, *37*, 70–78.
18. Liu, X.; Zhang, X.; Dang, Y.; Gao, W. Career Education Skills and Career Adaptability among College Students in China: The Mediating Role of Career Decision-Making Self-Efficacy. *Behav. Sci.* **2023**, *13*, 780. [[CrossRef](#)]
19. Zube, E.H. Environmental perception. In *Environmental Geology*; Springer: Dordrecht, The Netherlands, 1999; pp. 214–216.
20. Lin, E.S.; Chiu, S.Y. Does Holding a Postdoctoral Position Bring Benefits for Advancing to Academia? *Res. High. Educ.* **2016**, *57*, 335–362. [[CrossRef](#)]
21. Kis, A.; Tur, E.M.; Lakens, D.; Vaesen, K.; Houkes, W. Leaving academia: PhD attrition and unhealthy research environments. *PLoS ONE* **2022**, *17*, e0274976. [[CrossRef](#)]
22. Chen, S.H. Leaving academia: Why do doctoral graduates take up non-academic jobs and to what extent are they prepared? *Stud. Grad. Postdr. Educ.* **2021**, *12*, 338–352. [[CrossRef](#)]
23. Sverdlík, A.; Hall, N.C.; McAlpine, L.; Hubbard, K. The PhD Experience: A Review of the Factors Influencing Doctoral Students' Completion, Achievement, and Well-Being. *Int. J. Dr. Stud.* **2018**, *13*, 361–388. [[CrossRef](#)] [[PubMed](#)]
24. Mason, S.; Merga, M. Communicating research in academia and beyond: Sources of self-efficacy for early career researchers. *High. Educ. Res. Dev.* **2022**, *41*, 2006–2019. [[CrossRef](#)]
25. Tas, Y.; Demiral Uzan, M.; Uzan, E. Self-Efficacy for Research: Development and Validation of a Comprehensive Research Self-Efficacy Scale (C-RSES). *Int. J. Soc. Educ. Sci.* **2023**, *5*, 275–294. [[CrossRef](#)]
26. Bloch, C.; Graversen, E.K.; Pedersen, H.S. Researcher mobility and sector career choices among doctorate holders. *Res. Eval.* **2015**, *24*, 171–180. [[CrossRef](#)]
27. Hobin, J.A.; Clifford, P.S.; Dunn, B.M.; Rich, S.; Justement, L.B. Putting PhDs to Work: Career Planning for Today's Scientist. *CBE—Life Sci. Educ.* **2014**, *13*, 49–53. [[CrossRef](#)]
28. Lin, S.; Zhang, K.; Liu, J.; Lyu, W. Credential inflation and employment of university faculty in China. *Humanit. Social. Sci. Commun.* **2024**, *11*, 1191. [[CrossRef](#)]
29. Yang, L.; Webber, K.L. A decade beyond the doctorate: The influence of a US postdoctoral appointment on faculty career, productivity, and salary. *High. Educ.* **2015**, *70*, 667–687. [[CrossRef](#)]
30. Krull, S.; Silva, A.A.; Afanasyeva, D.; Christensen, S.; Agostinho, M. Time for change in research careers. *EMBO Rep.* **2022**, *23*, e54260. [[CrossRef](#)]
31. Powell, K. The future of the postdoc. *Nature* **2015**, *520*, 144–147. [[CrossRef](#)]
32. McAlpine, L.; Emmioğlu, E. Navigating careers: Perceptions of sciences doctoral students, post-PhD researchers and pre-tenure academics. *Stud. High. Educ.* **2015**, *40*, 1770–1785. [[CrossRef](#)]
33. Dorenkamp, I.; Süß, S. Work-life conflict among young academics: Antecedents and gender effects. *Eur. J. High. Educ.* **2017**, *7*, 402–423. [[CrossRef](#)]
34. McConnell, S.C.; Westerman, E.L.; Pierre, J.F.; Heckler, E.J.; Schwartz, N.B. United States National Postdoc Survey results and the interaction of gender, career choice and mentor impact. *eLife* **2018**, *7*, e40189. [[CrossRef](#)] [[PubMed](#)]
35. Scaffidi, A.K.; Berman, J.E. A positive postdoctoral experience is related to quality supervision and career mentoring, collaborations, networking and a nurturing research environment. *High. Educ.* **2011**, *62*, 685–698. [[CrossRef](#)]
36. Tomlinson-Clarke, S.M.; Chaudhary, S.; Gailliard, B.M. Exploring Personal and Contextual Factors Influencing Career Choice Among Biomedical PhD Students and Post-Doctoral Fellows. *Underst. Interv.* **2019**, *10*, 1–32.
37. McAlpine, L. Fixed-term researchers in the social sciences: Passionate investment, yet marginalizing experiences. *Int. J. Acad. Dev.* **2010**, *15*, 229–240. [[CrossRef](#)]
38. Teelken, C.; Van der Weijden, I. The employment situations and career prospects of postdoctoral researchers. *Empl. Relat.* **2018**, *40*, 396–411. [[CrossRef](#)]

39. Afonja, S.; Salmon, D.G.; Quailey, S.I.; Lambert, W.M. Postdocs' advice on pursuing a research career in academia: A qualitative analysis of free-text survey responses. *PLoS ONE* **2021**, *16*, e0250662. [\[CrossRef\]](#)
40. José Ribeiro, M.; Fonseca, A.; Ramos, M.M.; Costa, M.; Kiltner, K.; Möller Andersen, L.; Harber-Aschan, L.; Moscoso, J.A.; Bagchi, S. Postdoc X-ray in Europe 2017 Work conditions, productivity, institutional support and career outlooks. *bioRxiv* **2019**, 523621. [\[CrossRef\]](#)
41. Stephan, P. How to Exploit Postdocs. *BioScience* **2013**, *63*, 245–246.
42. Layton, R.L.; Brandt, P.D.; Freeman, A.M.; Harrell, J.R.; Hall, J.D.; Sinche, M. Diversity Exiting the Academy: Influential Factors for the Career Choice of Well-Represented and Underrepresented Minority Scientists. *CBE—Life Sci. Educ.* **2016**, *15*, ar41. [\[CrossRef\]](#)
43. Lindley, L.D. Perceived Barriers to Career Development in the Context of Social Cognitive Career Theory. *J. Career Assess.* **2005**, *13*, 271–287. [\[CrossRef\]](#)
44. Williams, C.M.; Subich, L.M. The gendered nature of career related learning experiences: A social cognitive career theory perspective. *J. Vocat. Behav.* **2006**, *69*, 262–275. [\[CrossRef\]](#)
45. Yadav, A.; Seals, C. Taking the next step: Supporting postdocs to develop an independent path in academia. *Int. J. STEM Educ.* **2019**, *6*, 15. [\[CrossRef\]](#)
46. Roach, M.; Sauermann, H. The declining interest in an academic career. *PLoS ONE* **2017**, *12*, e0184130. [\[CrossRef\]](#)
47. Heijstra, T.M.; O'Connor, P.; Rafnsdóttir, G.L. Explaining gender inequality in Iceland: What makes the difference? *Eur. J. High. Educ.* **2013**, *3*, 324–341. [\[CrossRef\]](#)
48. Ysseldyk, R.; Greenaway, K.H.; Hassinger, E.; Zutrauen, S.; Lintz, J.; Bhatia, M.P.; Frye, M.; Starkenburg, E.; Tai, V. A Leak in the Academic Pipeline: Identity and Health Among Postdoctoral Women. *Front. Psychol.* **2019**, *10*, 1297. [\[CrossRef\]](#)
49. Miller, D.I.; Wai, J. The bachelor's to Ph.D. STEM pipeline no longer leaks more women than men: A 30-year analysis. *Front. Psychol.* **2015**, *6*, 37. [\[CrossRef\]](#)
50. Martinez, E.D.; Botos, J.; Dohoney, K.M.; Geiman, T.M.; Kolla, S.S.; Olivera, A.; Qiu, Y.; Rayasam, G.V.; Stavreva, D.A.; Cohen-Fix, O. Falling off the academic bandwagon. *EMBO Rep.* **2007**, *8*, 977–981. [\[CrossRef\]](#)
51. Bataille, P.; Le Feuvre, N.; Kradolfer Morales, S. Should I stay or should I go? The effects of precariousness on the gendered career aspirations of postdocs in Switzerland. *Eur. Educ. Res. J.* **2017**, *16*, 313–331. [\[CrossRef\]](#)
52. van der Weijden, I.; Teelken, C.; de Boer, M.; Drost, M. Career satisfaction of postdoctoral researchers in relation to their expectations for the future. *High. Educ.* **2016**, *72*, 25–40. [\[CrossRef\]](#)
53. Wang, Y.; Main, J.B. Postdoctoral research training and the attainment of faculty careers in social science and STEM fields in the United States. *Stud. Grad. Postdr. Educ.* **2021**, *12*, 384–402. [\[CrossRef\]](#)
54. Gibbs, K.D.; Griffin, K.A. What Do I Want to Be with My PhD? The Roles of Personal Values and Structural Dynamics in Shaping the Career Interests of Recent Biomedical Science PhD Graduates. *CBE—Life Sci. Educ.* **2013**, *12*, 711–723. [\[CrossRef\]](#) [\[PubMed\]](#)
55. Blackford, S. A qualitative study of the relationship of personality type with career management and career choice preference in a group of bioscience postgraduate students and postdoctoral researchers. *Int. J. Res. Dev.* **2010**, *1*, 296–313. [\[CrossRef\]](#)
56. Ullrich, L.E.; Ogawa, J.R.; Jones-London, M.D. Factors That Influence Career Choice among Different Populations of Neuroscience Trainees. *Eneuro* **2021**, *8*, ENEURO.0163-0121.2021. [\[CrossRef\]](#)
57. Gibbs, K.D.; McGready, J.; Griffin, K. Career Development among American Biomedical Postdocs. *CBE—Life Sci. Educ.* **2015**, *14*, ar44. [\[CrossRef\]](#)
58. St. Clair, R.; Hutto, T.; MacBeth, C.; Newstetter, W.; McCarty, N.A.; Melkers, J. The “new normal”: Adapting doctoral trainee career preparation for broad career paths in science. *PLoS ONE* **2017**, *12*, e0177035.
59. Roach, M.; Sauermann, H. A taste for science? PhD scientists' academic orientation and self-selection into research careers in industry. *Res. Policy* **2010**, *39*, 422–434. [\[CrossRef\]](#)
60. Nordling, L. How ChatGPT is transforming the postdoc experience. *Nature* **2023**, *622*, 655–657. [\[CrossRef\]](#)
61. Nordling, L. Postdoc career optimism rebounds after COVID in global Nature survey. *Nature* **2023**, *622*, 419–422. [\[CrossRef\]](#)
62. Nordling, L. Falling behind: Postdocs in their thirties tire of putting life on hold. *Nature* **2023**, *622*, 881–883. [\[CrossRef\]](#)
63. Castelló, M.; McAlpine, L.; Pyhältö, K. Spanish and UK post-PhD researchers: Writing perceptions, well-being and productivity. *High. Educ. Res. Dev.* **2017**, *36*, 1108–1122. [\[CrossRef\]](#)
64. Horta, H. Holding a post-doctoral position before becoming a faculty member: Does it bring benefits for the scholarly enterprise? *High. Educ.* **2009**, *58*, 689–721. [\[CrossRef\]](#)
65. Åkerlind, G. Postdoctoral Researchers: Roles, Functions and Career Prospects. *High. Educ. Res. Dev.* **2005**, *24*, 21–40. [\[CrossRef\]](#)
66. Kinman, G.; Court, S. Psychosocial hazards in UK universities: Adopting a risk assessment approach. *High. Educ. Q.* **2010**, *64*, 413–428. [\[CrossRef\]](#)
67. Costello, T.J. NextGen postdocs. *Science* **2018**, *360*, 689. [\[CrossRef\]](#)
68. Liu, X.; Zhang, L.; Zhang, X. Sleep Quality and Emotional Adaptation among Freshmen in Elite Chinese Universities during Prolonged COVID-19 Lockdown: The Mediating Role of Anxiety Symptoms. *Int. J. Ment. Health Promot.* **2024**, *26*, 105–116. [\[CrossRef\]](#)
69. Nerad, M.; Cerny, J. Postdoctoral Patterns, Career Advancement, and Problems. *Science* **1999**, *285*, 1533–1535. [\[CrossRef\]](#)
70. Moors, A.C.; Malley, J.E.; Stewart, A.J. My Family Matters: Gender and Perceived Support for Family Commitments and Satisfaction in Academia Among Postdocs and Faculty in STEMM and Non-STEMM Fields. *Psychol. Women Q.* **2014**, *38*, 460–474. [\[CrossRef\]](#)

71. Baader, M.S.; Böhringer, D.; Korff, S.; Roman, N. Equal opportunities in the postdoctoral phase in Germany? *Eur. Educ. Res. J.* **2017**, *16*, 277–297. [[CrossRef](#)]
72. Huang, K.-L. Ten Simple Rules for landing on the right job after your PhD or postdoc. *PLoS Comput. Biol.* **2020**, *16*, e1007723. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.