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Development and Reliability of a Questionnaire Assessing Stress, Coping, and Empathy (SCOPE) in Occupational Settings: Preliminary Evidence from Veterinarians

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Abstract: Workplaces can be associated with occupational stress, detrimental consequences in terms of loss of health and reduced psychosocial well-being. Importantly, employees may be particularly at risk of poorer well-being during times of adversity at work, when not able to apply adaptive coping strategies and adopt a more empathetic approach. This study aimed to develop a scale to estimate occupational stress both in terms of situational and individual components, by performing item selection, internal reliability assessment, and investigation of the ceiling/floor effect. The target population consisted of veterinarians (n = 116), based on evidence of high risk of occupational stress and related mental distress. Out of twenty initial candidate entries, exploratory factor analysis retained fifteen items consisting of three domains related to occupational stress, copying strategies, and empathy (SCOPE). The SCOPE scale demonstrated good internal consistency as a whole (Cronbach's alpha = 0.79) and when considering the three subscales (stress, 0.85; coping, 0.77; and empathy, 0.71). On a possible range from 15 (worst adjustment) to 75 (best adjustment), the sample mean performance was 51.68 (SD, 8.50). Preliminary evidence indicated that the SCOPE questionnaire may reveal differential effects of type of work on levels of occupational stress and related coping and empathy skills.

Keywords: psychological wellbeing; psychiatric distress; resilience; mental health; job difficulties; psychometric scale; statistics

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1. Introduction

The last two decades have witnessed increased interest into the harmful effects that workplace and occupational stress may have in terms of loss of health and reduced psychosocial wellbeing [1,2]. Evidence has been accumulating that workplace stress represents a very complex phenomenon accounting for *situational* components such as job demands and resources but also extending to *individual* aspects, including coping strategies, self-care, and personal resilience [3,4]. To contemplate the wider ramifications of workplace stress, a report commissioned by the European Agency for Safety and Health at Work described it as "a psychological state which is part of and reflects a wider process of interaction between the person and their work environment" [5].

1.1. Theoretical Framework

Briefly, working in demanding conditions has been associated with poor work performance [6] and cognitive stress symptoms when it overburdens the individual capacity to process information [7,8]. Such evidence has fueled the promotion of workplace interventions directed at employees who work in demanding conditions [9]. However, independent

research suggests that individual characteristics may modulate the way people respond to job demands, with differential effects in terms of experience of work-related stress [10]. Specifically, coping strategies employed by workers may differ considerably [11] in terms of how they are adaptive (e.g., learning from the event) or maladaptive (e.g., avoidance strategies), problem-focused (e.g., centered on working skills), and positively (e.g., centered on recognition and acceptance of own emotional response) or negatively (e.g., rumination or denial of the problem) emotion-focused [12–15]. Also, workers may differ in their being prone to taking care of their own health, from neglecting it to reorganizing their work or daily routine to increase personal wellbeing [16–18]. Finally, resilience, that is, the process of healthy functioning in the face of adversity [19–21], has been shown to be crucial for stress management [22,23], becoming the focus of preventative actions [24]. Highly relevant, elevated levels of self-care [25] and resilience [26] have been reported to support the use of adaptive coping mechanisms, blunting the risk of occupational stress related conditions such as burnout, where emotional exhaustion, cynicism, and a reduced sense of work-related personal accomplishment are experienced [27], as well as compassion fatigue, where empathy is felt lost and feelings like shame, anger and guilt emerge [28].

A very recent systematic review suggested a framework to describe the connections between different levels of work environment and health outcomes, based on (i) macro-level economic, social, and political structures, (ii) meso-level workplace structures, (iii) meso-level psychosocial working conditions, and (iv) individual-level experience and cognitive and emotional processes. Interestingly, it is believed through perceptions and psychological processes at the individual level that these macro- and meso-level social processes directly affect the psychobiological homeostasis of the employee or modify their health-related behavior and lifestyle, with detrimental health consequences. Nevertheless, a gap in the literature was revealed regarding the understanding of how psychological processes are involved in the association between external work stressors and poor health [29].

Despite such developments in the understanding of workplace stress, there is a lack of validated, applicable, and sensitive scales to measure its multifaceted components, with particular attention to psychological mechanisms that may accentuate occupational stress as well as behavioral tools that may be used to offset or overcome it. Most research conducted so far has focused on single aspects of stress in occupational settings with reference to burnout such as job satisfaction or intention to quit [30–32]. Even when taking into account social aspects [33–35], occupational stress scales have not fully investigated workers' personal psychological functioning. On the other hand, available scales to assess psychological constructs such as coping [36] and empathy [37] have not been designed to examine stress in occupational settings. In fact, very limited attempts have been made at developing a scale intercepting occupational stress in a comprehensive perspective. A recent input came from a study developing an instrument to assess long-term care and quality of life [38], however no tool has been developed to help in assessing occupational stress by also identifying common related aspects such as coping strategies and empathy. Such scales may prove useful in collecting evidence to inform policy and practice.

1.2. Objectives

The aim of this study was to develop a new questionnaire aiming at estimating occupational stress both in terms of situational and individual components. To this end, we performed item selection, internal reliability assessment, and investigation of ceiling/floor effect.

2. Materials and Methods

2.1. Participants

The target population consisted of veterinarians of all ages. More precisely, all 535 members of the local Veterinary Medical Association (Verona, Italy) were contacted. This choice was driven by accumulating evidence describing veterinarians as subjects at high risk of experiencing occupational stress and difficulties in coping with their preoc-

cupation, self-doubt, conflicting responsibilities (e.g., care of the animal versus financial demands of the business), and insufficient support [39]. Importantly, stress in the workplace has been suggested to affect veterinarians' self-care, with potential detrimental consequences in terms of developing burnout [40] and anxious-depressive symptoms [39,40], and attempting suicide [39]. In particular, a systematic review of suicide rates in the veterinary profession found that between 0 and 43% of veterinary surgeon deaths were due to suicide, with a higher overall suicide risk as compared to the general population rate [41]. Such evidence has raised the question about the opportunity of teaching personal and coping skills to undergraduate veterinary students as well as supporting such skills throughout their career [40].

2.2. Questionnaire Development

In line with the literature [42], the questionnaire development was based on the following steps: (i) determining the construct of interest (assessing both situational and individual components of reduced wellbeing at the workplace), (ii) conducting a literature review (absence of validated instrument developed to be administered among the intended population of veterinarians), (iii) identifying the multidimensionality of the instrument (potential dimensions were considered equally important), (iv) determining the format in which the questionnaire will be administered (self-administered, easily understandable, and brief items), (v) determining item format (close ended items on a Likert-type scale assessing frequency of an event [43,44]), (vi) item development (simple and short items assessing only a single issue, centered around the concepts of occupational stress, coping strategies, and empathy, written ex novo or inspired by questionnaires already validated in the literature), (vii) determining the intended length of the questionnaire (parsimonious structure consisting of items representing the construct of interest); and (viii) review and revision. A pool of experts (made up of two psychologists, a psychiatrist, two veterinarians and a biostatistician, who assessed congruity and clarity of the items and drew up a final list of items) was involved in the process, discussing the matters together in order to agree on a common position for each step. Data as to age, sex, seniority, and veterinary type of practice were also collected.

2.3. Procedures

The questionnaire was developed by "Google Form" and sent by e-mail to all veterinarians. All the questions were distributed on one page. The completeness check was automatically performed by the Google Form Sheet, as it was necessary to complete all the questions before sending the response. There wasn't a review step in which participants could check their answer before sending it. The e-mail also contained the explicit informed consent. The study was approved by the local Ethic Committee. Participation in the study was completely voluntary. Nor incentives were offered, neither advertising for promotion was performed. Data were collected between June 2021 and November 2021. The questionnaire was developed following the CHERRIES guidelines [45].

2.4. Statistical Analyses

The sample characteristics were reported as mean and standard deviation for continuous variables and counts and percentages for categorical variables. The Spearman correlation matrix was developed, and the Bartlett and Kaiser-Meyer-Olkin tests were used to evaluate the adequacy of the data correlation structure. Since no a priori underlying constructs were hypothesized, an exploratory factor analysis was performed by using principal-component as extraction method. The scree plot method was used to identify the number of retainable factors and Promax rotation was applied to separate factors by accounting for correlation between factors. As sensitive analysis, varimax rotation was also applied. The percentage of total variance explained by factors was estimated. As suggested by Norman and Streiner, we used $\frac{5.152}{\sqrt{n-2}}$ as the cutoff for retaining items with statistical significance at 1% [46]. Further, only items with a uniqueness lower than 0.6

were considered as suggested in the literature [47]. After elimination of redundant items, internal consistency was estimated by global and factor-specific Cronbach-alpha values. Loevinger's H index was also used to estimate the internal monotonic homogeneity of the questionnaire.

A global score was calculated attributing to each answer a value ranging from 1 (most negative Likert level) to 5 (most positive Likert level) and subsequently adding all values. Moreover, the Ceiling-Floor effect was estimated by the proportion of respondents whose scores were the highest (ceiling) or the lowest (floor) across any domain. Values higher than 15% were considered significant. No formal power analysis was performed; conduction of data analysis was bound to the achievement of the minimum number of participants suggested by the literature for the exploratory factor analysis (i.e., 5 patients/item) [48]. Statistical significance was set at 5%. Statistical analysis was performed using the STATA16.0 software (www.stata.com) and Microsoft Excel 2021 (www.microsoft.com).

3. Results

3.1. Questionnaire Development

A first draft of 35 candidate entries was obtained, focusing on resilience, compassion fatigue, communication skills, anxiety, emotional intelligence, empathy, depression, and burnout. After removing duplicates, overlapping items, and items not reaching a consensus for inclusion, 20 items were chosen during the second panel discussion. All items were questions, whose answers consisted of a 5-point Likert scale. All items are reported in Table 1.

Table 1. List of initially selected items.

		Item	Score
	1	When something unexpected happens	1: I am often confused/5: I always find a solution
	2	If I cannot control situations in my life	1: I constantly get anxious and worried/5: I cope with this
	3	I have felt stucked in my job	1: very often/5: never/hardly ever
*	**4**	I have flashbacks to experiences with my customers	1: very often/5: never/hardly ever
	5	I have felt hopeless with my job	1: very often/5: never/hardly ever
*	**6**	While working, suddenly and involuntarily, I have recalled a dreadful experience of mine	1: very often/5: never/hardly ever
*	**7**	I can separate my job from my private life successfully	1: never/hardly ever/5: very often
*	**8**	I cannot sleep due to a traumatic experience at work	1: very often/5: never/hardly ever
	9	I feel useless/frustrated at work	1: very often/5: never/hardly ever
	10	My communicative skills help my work relations	1: never/hardly ever/5: very often
	11	In a stressful situation, I have felt mentally unbalanced	1: very often/5: never/hardly ever
	12	In a stressful situation, I have felt upset	1: very often/5: never/hardly ever
	13	I am conscious of my emotions	1: never/hardly ever/5: very often
	14	I am aware of other people's emotions	1: never/hardly ever/5: very often
	15	I get easily involved in other people's feelings	1: never/hardly ever/5: very often
	16	I can easily empathize with other people's feelings	1: never/hardly ever/5: very often
	17	In general, I consider myself:	1: a pessimist/5: an optimist
	18	In general, I can get satisfaction from my interests	1: never/hardly ever/5: very often
	19	My job physically exhausts me	1: very often/5: never/hardly ever
*	**20**	I think visitors/customers are ungrateful	1: very often/5: never/hardly ever

* Removed after factor analysis.

3.2. Response Rate and Study Sample Characteristics

Out of 535 contacted veterinarians, 116 filled the questionnaire and were thus included in the study. Further, 56 (48.28%) of them were women and 59 (50.86%) were men. One subject declared "other" as sex. The median age category was 40–49 years old. Most of the participants (62 subjects, 53.45%) worked in veterinary ambulatories, 18 (15.52%) worked in animal husbandry and 14 (12.07%) were veterinarians in local health districts (Table 2).

Table 2. Sample characteristics and score distribution.

		N (%)	Mean Score (SD)	*p* Value *
Sex	Men	59 (50.86%)	53.05 (8.75)	0.17
	Women	56 (48.28%)	50.16 (8.11)	
	Other	1 (0.86%)	56 (.)	
Age (years)	20–29	12 (10.34%)	47.67 (4.83)	0.10
	30–39	22 (18.97%)	50.23 (7.81)	
	40–49	26 (22.41%)	50.19 (9.65)	
	50–59	33 (28.45%)	54.67 (9.22)	
	60–69	22 (18.97%)	52.23 (7.09)	
	70–79	1 (0.86%)	60.00 (1)	
Workplace	Veterinary ambulatories	62 (53.45%)	49.10 (8.06)	0.002
	Animal husbandry	18 (15.52%)	54.83 (8.18)	
	Local health districts	14 (12.07%)	57.07 (7.46)	
	Other	22 (18.97%)	52.95 (8.32)	

* Statistical significance of score differences assessed by one-way ANOVA models.

3.3. Construct Validity

Spearman correlation matrix (Supplementary Table S1) showed a good data factorability since all items correlated 0.2 with at least one other item. Moreover, the Bartlett test showed high statistical significance ($p < 0.001$) and the Kaiser-Meyer-Olkin test (KMO statistic = 0.779) showed adequacy of the correlation matrix for the purpose of the study. Finally, all uniqueness values were well under 0.7, showing how each item shared common variance with other items. The scree plot visual analysis identified the presence of three retainable factors. Following Promax rotation, five items were removed from the questionnaire since they did not reach the predetermined factor-loading threshold ($\frac{5.152}{\sqrt{n-2}} = 0.48$; Table 3). Therefore, the final questionnaire consisted of 15 items, with a possible total score ranging from 15 (worst) to 75 (best) points. The first factor explained 22.46% of the total variance and consisted of items related to occupational stress (7 items; "stress score" range: 7–35). The second and third domains accounted for 15.22% and 14.11% of the total variance and were related to coping strategies (5 items; "coping score" range: 5–25) and empathy (3 items; "empathy score" range: 3–15), respectively. The questionnaire was named Stress Coping Empathy (SCOPE).

The correlation between items is summarized in the biplot in Figure 1 where items within the same dimension are represented in the same color.

Overall Cronbach's alpha estimated statistic was 0.79, while the domain-specific alpha values were 0.85, 0.77 and 0.71 for domains one, two, and three, respectively. All alpha values were above the commonly acceptability thresholds of 0.6–0.7 [49,50]. Furtherly, Loevinger's H estimates were 0.42, 0.45 and 0.51, thus showing an acceptable internal homogeneity [51]. When the varimax rotation was used instead of the Promax, we obtained superimposable results.

Table 3. Factor-loadings and Uniqueness after factor analysis.

Item	Stress	Coping	Empathy	Uniqueness
1	0.2703	**0.8132**	−0.0716	**0.2969**
2	0.3051	**0.6477**	−0.0765	**0.2955**
3	**0.6281**	−0.1331	0.1873	**0.4297**
4	0.1889	−0.1891	−0.1504	**0.4968**
5	**0.6636**	−0.0158	−0.0264	**0.3154**
6	0.2436	0.0339	−0.1643	**0.4769**
7	−0.0173	0.3279	−0.0132	**0.3541**
8	0.4390	−0.1248	0.0038	**0.3936**
9	**0.6644**	0.1341	−0.0590	**0.3356**
10	0.0986	**0.5525**	0.3120	**0.4155**
11	**0.6678**	0.3363	−0.2085	**0.3197**
12	**0.7684**	0.0786	0.0072	**0.3719**
13	−0.2272	**0.6067**	0.2134	**0.3409**
14	−0.0969	0.2041	**0.6898**	**0.3252**
15	0.0838	−0.1662	**0.7782**	**0.3300**
16	0.0712	0.1014	**0.8503**	**0.2229**
17	**0.6745**	−0.0064	0.2881	**0.5136**
18	−0.1370	**0.6343**	0.0900	**0.4435**
19	**0.5060**	−0.0666	0.0248	**0.5190**
20	0.0318	−0.0029	−0.0335	**0.4606**

Factor-loadings of the items for each of the three factors identified by the Exploratory Factor Analysis (Stress, Coping, Empathy) and overall uniqueness. For each factor, items with factor-loading above the cutoff (0.48) are in bold and were included in the factor with 1% statistical significance. Items 4, 6, 7, 8, and 20 were discarded from the final SCOPE questionnaire, since they had no significant factor-loading for any of the three factors.

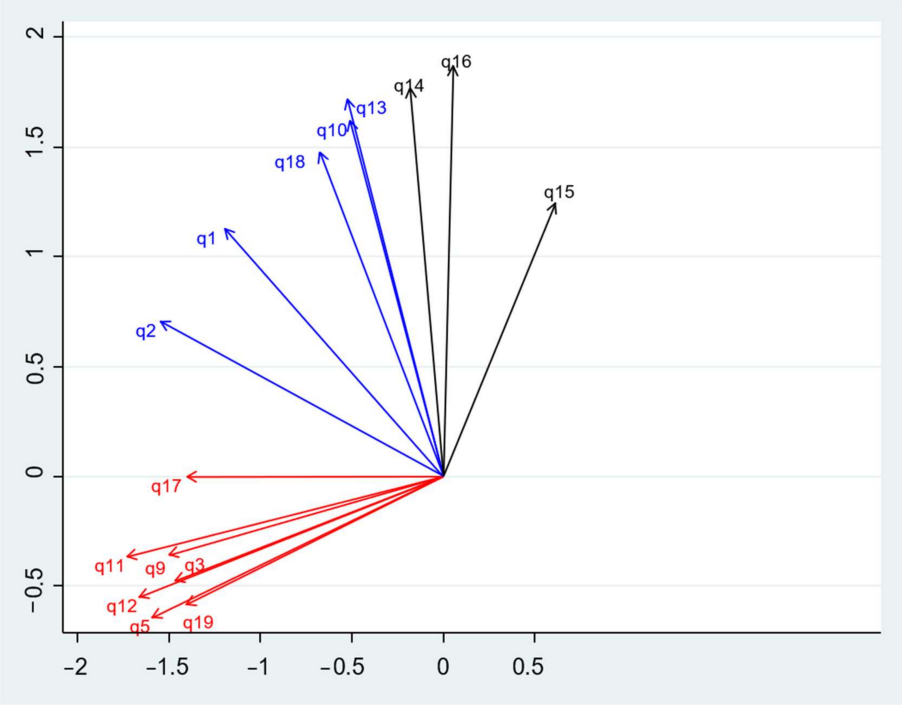

Figure 1. Biplot after factor analysis. Correlations are approximated by the cosine of angles between vectors. Red: Stress; Blue: Coping; Black: Empathy.

3.4. Performance of the SCOPE Questionnaire in the Study Sample

The total questionnaire-score was normally distributed (Shapiro-Wilk test; $p = 0.08$). The mean value was 51.68 score-points and the standard deviation was 8.50 score-points. There was no evidence of a floor or ceiling effect in either the global or domain-specific scores, since frequencies of extreme values were not above 5%. (Figure 2). Participants working in veterinarian ambulatories reported a lower mean SCOPE score when compared to veterinarians working in other workplaces. On the contrary, no differences emerged between sex categories. Though not significant, a clinically relevant trend was observed with reference to participants' age, with higher scores as a function of age (Table 2).

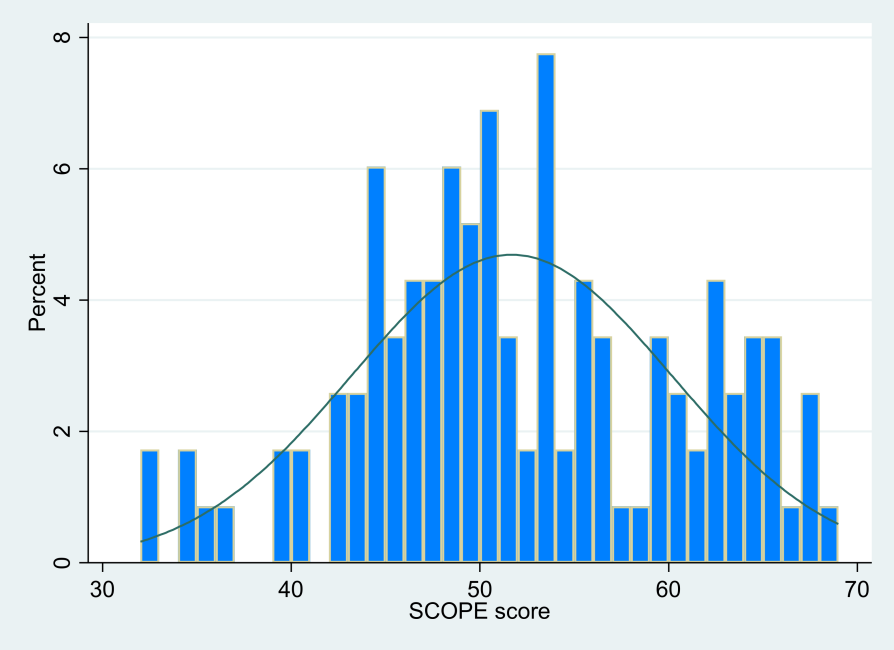

Figure 2. Global score distribution; extreme scores: 32 (1.72%), 69 (0.86%).

4. Discussion

The aim of this study was to develop a scale that measures employees' occupational stress by combining both external (i.e., events at work that cannot be easily controlled and cause stress) and internal (i.e., the psychological mindset of responses to stress at work) components. The exploratory factor analysis on a sample of veterinarians, a working population subject to occupational stress, generated a 15-item scale with three factors: Stress, Coping, and Empathy (SCOPE). The scale demonstrated good internal consistency as a whole, and when considering the three subscales. Preliminary evidence suggested that the SCOPE scale may capture different levels of occupational stress as a function of type of work and related coping and empathy skills.

Literature reappraisals indicate that greater emphasis should be placed on awareness of occupational stress among workers, especially when working in demanding conditions [52,53]. Importantly, research evidence suggests that employees may be particularly at risk of poorer wellbeing during times of adversity at work, when not able to apply adaptive coping strategies and adopt a more resilient approach [54–56]. Nevertheless, to date, no specific research had been done to identify domains and items holding significance in terms of occupational stress and related abilities to face it in a wider perspective.

4.1. Occupational Stress

A recent review systematically assessing scales used to measure job stressors in very demanding working conditions identified both generic scales, used in all sectors of professional activities, and healthcare scales, used in the field of human health [57]. The identified

general scales appeared to be heavily focused on objective aspects of occupational stress such as high job demands, disadvantages in comparison to other occupational situations, and organizational resources, rather than subjective elements of stress at work. Healthcare settings scales seemed to pay more attention to difficulties arisen in the relation with service users and relatives as well as dealing with ethically- and morally-related situations. Also, a limited number of tools resulted to support the investigation of social support (e.g., the Job Content Questionnaire, JCQ [33,34]) or job reward (e.g., the Effort-Reward Imbalance, ERI, scale [35]) in explaining work-related distress, despite not increasing the explained variance of outcomes in empirical studies [58,59]. However, no scale fully investigated personal resources and vulnerabilities along with objective measures of occupational stress.

4.2. Coping

On the other hand, a meta-analysis of studies using a coping scale identified several instruments employed in more than 2000 publications over a 12-year span, mostly used to investigate coping strategies in individuals with health issues [36]. The most-used scales were the Ways of Coping Questionnaire (WCQ; [60]) and the COPE scale [61]. However, such instruments were found to have been used to assess a particular stressor by specifying stressors within the measure, for example by describing a specific stressful event and rating one's coping with the event. No specific scale appeared to be designed to address coping skills in the context of occupational stress examination.

4.3. Empathy

Further, a recent systematic review and reliability generalization meta-analysis of studies adopting the Basic Empathy Scale (BES), one of the most commonly-used instruments internationally [62], revealed an increasing number of studies over the years, mostly focusing on adolescent populations and legal implications as well as clinical populations [37]. Similarly, some instruments have been identified to measure healthcare professionals' empathy [63]. Instead, the role of empathy in other working populations and in occupational settings more in general through properly designed tools has not been the object of investigation.

4.4. The SCOPE Scale: Development and Preliminary Evidence in the Veterinary Population

Even though both personal and organizational factors have been shown to modulate veterinarians' professional quality of life [44], it is worth mentioning that all these tools have been validated in populations other than veterinarians. The few studies focusing on veterinarians' well-being conducted so far have collected qualitative data [39] or used general scales not specifically designed for this working population [40].

The iterative stages in this study were based on accumulating evidence that objective (e.g., recalling a dreadful experience at work, insomnia due to a traumatic experience at work) and subjective (e.g., dealing with unexpected, getting involved in other people's feelings) experiences at work are equally important to predict workers 'distress when faced with adversity throughout their careers. In fact, research evidence emphasizes the complexity of workers' well-being, where organizational and systems-level factors [64–70] engage in an interplay with personal and interpersonal-level factors [71–77] in determining how employees react to the stressors encountered in their working life to remain healthy. Findings from this study present with theoretical implications in a research perspective, as they suggest that future studies should have a much more comprehensive approach to occupational stress by paying attention to well-being constructs that are generally overlooked when investigating levels of stress in work settings.

While not being the main aim of this work, preliminary evidence indicates that the SCOPE questionnaire may distinguish differential effects of type of practice on levels of occupational stress and related coping and empathy skills. Also, a possible effect of age, with older employees performing better on the questionnaire, was found. Despite awaiting further investigation in populations with different characteristics, these results may offer

practical implications for work settings, as they suggest that workers holding the same job title but performing different duties with different responsibilities, may sensibly differ in their levels of occupational stress. Also, employees' years of experience, which may reflect greater knowledge and skills, need to be considered when assigning potentially stressful duties, as the latter may impact differently workers early in their career.

4.5. Study Limitations

The current study results must be seen considering some limitations. While developing the scale in a specific working population offered advantages in terms of a controlled sample, it may at the same time have limited the ability to generalize the present results to the wider population of workers. Investigations in populations other than veterinarians are thus needed to inform the SCOPE questionnaire's application in other working contexts. Another limitation of the present study is that, due to its design, it was not possible to examine the test-retest reliability of the scale, which will be investigated in further studies. Moreover, the scale utility as a screening tool for occupational stress-related outcomes remains unknown and needs to be externally validated to generalize the findings of this study to other measures. Further, as both qualitative [39] and quantitative [40] research methods have proven their utility in the study of veterinarians' well-being in the workplace, future studies will have to integrate benefits of both methods to gain a more complete picture of the phenomenon. Finally, the study's sample size was limited. Therefore, the factorial structure of the questionnaire will need confirmation in larger samples.

5. Conclusions

In conclusion, the SCOPE questionnaire may be useful in assessing occupational stress on one hand, and coping difficulties and empathy on the other, in line with evidence that they are intimately related in modulating distress in the workplace [39,40]. The rationale for the SCOPE scale development was to integrate concrete components of the working experience while acknowledging the subjective perception of occupational stress. Thus, this instrument has the potential benefit to differentiate occupational stress characteristics of individuals working in the same employment context but reacting differently to stressful experiences at work. Also, the current work is timely due to the increasing research interest into the effects that the ongoing coronavirus pandemic [78,79] as well as the sociocultural changes expected over the next years [80,81] will have on work-related wellbeing. The development of the SCOPE questionnaire will add to the growing efforts to draw attention to and implement individual resources as an integral part to sustain well-being in the workplace.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/psychiatryint3040029/s1, Supplementary Table S1. Correlation matrix of items' scores.

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