



ORIGINAL ARTICLE

Resilience in animal care professions: does the stress shield model fit?

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Animal care professionals can experience adverse psychological outcomes due to their work, therefore research exploring supporting resilience in this population is needed. This study investigated the capacity of the Stress Shield Model (SSM) to explain relationships between individual, interpersonal, and organisational factors with outcomes in resilience (resilience, growth, and job satisfaction) in animal care professionals. Empowerment was hypothesised to mediate these relationships. Australian and New Zealand animal care professionals (N = 393) completed an online survey measuring conscientiousness, coping, team and leader relationships, job demands, organisational resources, empowerment, growth, resilience, and job satisfaction. Results indicated that SSM can partially explain relationships between individual, interpersonal, and organisational factors and outcomes in resilience, and empowerment partially mediated the effect of organisational resources on growth. Problem-approach coping positively predicted resilience and growth; conversely, emotion-avoidant coping negatively predicted these outcomes. Conscientiousness positively predicted resilience and negatively predicted job satisfaction. Team relationships positively predicted growth and resilience, while leader-member relationships positively predicted job satisfaction. Organisational resources positively predicted resilience, growth, and job satisfaction, conversely, job demands predicted reductions across these outcomes. Findings indicate supporting resilience in animal care professionals requires fostering individual, interpersonal, and organisational resources.

Keywords animal carers; organisational psychology; resilience; stress shield model; workplace stress

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There are many occupations within the animal care industry (veterinarians, veterinary nurses and technicians, animal attendants, kennel hands, wildlife carers, zookeepers, and laboratory animal technicians), with people often entering these professions out of a desire to care for and promote animal welfare.¹ Compassion satisfaction, a sense of reward and gratification from caring, has been identified in these populations.^{2, 3} However, these professionals also experience occupational stressors including high workloads, fast-paced environments, emergency situations, risk of injury and zoonosis, and high variability and complexity between cases.^{4, 5} These can be further

exacerbated by the emotional labour in witnessing animal suffering and death, and the associated grief of humans.^{2, 5} Animal care professionals may also encounter moral stress produced by conflicts between personal motivations to improve animal welfare and workplace requirements to provide treatments they do not endorse.¹

These stressors are usually essential to their role and therefore unavoidable, placing animal care professionals at increased risk of experiencing distress and poor psychological health outcomes.^{5, 6} Such outcomes include compassion fatigue, burnout, symptoms of traumatic stress, depression, and suicide.^{1, 7} Understanding the workplace and individual factors protecting animal care professionals from such adverse outcomes is therefore essential.

Stress shield model

The Stress Shield Model (SSM)⁸ proposes an explanation of how resources and individual competencies are utilised to translate workplace challenges into experiences that are meaningful, manageable, and coherent.⁹ Developed and validated in the police population, the SSM describes relationships between individual, interpersonal, and organisational resources and resilience in the workplace context.⁸ The SSM proposes empowerment mediates these relationships, as it enables individuals to draw upon available resources and translate workplace experiences into meaningful, coherent, and manageable experiences.⁸ The SSM provides a possible explanation of, and mechanism for promoting, resilience in animal care professionals.

Resilience

Resilience has been given various definitions. This study will draw on the definition of resilience proposed by the SSM as an individual's capacity to render challenges as meaningful, manageable and coherent by drawing on the available individual, interpersonal, and organisational resources.⁸ This definition incorporates the concept of resilience as an adaptive capacity, reflecting an individual's capacity to cope with, adapt to and develop from current and future challenges.⁸

Resilience as a measurement captures an individual's capacity to draw on available resources to maintain wellbeing and return to previous levels of functioning, following stressful events which have disrupted pre-existing schemas.¹⁰ Retaining wellbeing requires adverse situations to be cognitively re-organised into experiences that are meaningful, coherent, and manageable.^{10, 11} Resilience is negatively related to burnout and compassion fatigue and positively related to compassion satisfaction in first responders and health professionals.¹² This

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suggests resilience may also play an important role in protecting and promoting the wellbeing of animal care professionals.

Growth

Growth differs from measures of resilience as it reflects a capacity to accommodate new information gained from significantly stressful experiences, resulting in enhanced functioning, whereas persons exhibiting resilience will return to previous levels of functioning.^{10, 13} As measurements of resilience and growth capture distinct processes, with growth reflecting an individual's capacity to develop from significant stressors, it is essential to incorporate both outcomes in investigations of workplace resilience as an adaptive capacity.⁸ Animal care professionals encountering death and suffering of animals may experience psychological strain and moral stress.^{1, 2} Such experiences can disrupt worldviews. In order to grow and overcome distress, individuals must broaden previous interpretations and generate meaning from these experiences.¹⁴ Growth following traumatic and stressful workplace events has been reported in first responders^{15, 16} and human health sector personnel.¹⁷ Therefore, an animal care professional's capacity to generate meaning and coherence from workplace difficulties is likely to influence growth.

Job satisfaction

As proposed by the SSM, job satisfaction measurements can capture experiences of manageability and meaningfulness (components of resilience) in the workplace context, thus signifying employee resilience to workplace-specific challenges.⁸ In health care professionals, job satisfaction has been found to positively relate to perceptions of competency in personal ability¹⁷ and meaning in their roles.¹⁸ Parallels of meaning and satisfaction can also be seen in animal care professionals. Many animal carers report working with animals as desirable⁶ and find a sense of purpose and achievement in their work.^{1, 19} These preliminary findings indicate meaning and manageability may heighten job satisfaction.

Empowerment

Psychological empowerment is a construct comprising individual cognitions of competence, meaning, self-determination, and impact.^{20, 21} Empowerment is influenced by subjective perceptions and experiences in the work environment.²⁰ Workplace environments comprise individual responses, interpersonal interactions, and organisational climate.⁸ Together these elements create the context in which employees learn and develop empowering schemas, enabling individuals to draw upon available resources and influencing how workplace challenges are interpreted, responded to, and planned for.⁸ This in turn fosters resilience and adaptation to existing and future workplace incidents.⁸ Higher employee empowerment has been associated with reductions in negative psychological health outcomes²² and increases in job satisfaction.²³ As proposed by the SSM, empowerment can mediate relationships between the individual, interpersonal, and organisational resources, and resilience (as measured by resilience, growth, and job satisfaction) in animal care professionals.

Individual personality and coping

In the SSM, the personality trait conscientiousness correlates with empowerment, as individuals displaying this trait are more likely to

appraise themselves as having the competence to meet challenges, perceive successful performance, and exert effort toward overcoming difficult situations.^{24, 25} Conscientiousness has been found to positively correlate with empowerment,²⁶ resilience,²⁷ growth²⁸ and job satisfaction¹⁷ in human care providers. Thus, higher conscientiousness in animal care professionals may predict increases in empowerment, resilience, growth, and job satisfaction.

Another individual factor considered in the SSM is coping strategies.²⁹ Previous studies commonly categorise coping as 'problem-focused' or 'emotion-focused' styles.³⁰ Emotion-focused coping includes cognitive reappraisals, avoidance, and disengagement from stressors.³⁰ Emotion-focused coping is proposed to be adaptive in uncontrollable situations,²⁹ however, can result in disempowerment due to inaction, and reinforcing perceptions of limited impact, choice, and competency.²¹ Conversely, problem-focused coping involves approaching problems, generating solutions, and taking action to improve situations³⁰ which appears to promote adaptation and resilience.¹⁵

Organisational climate

Organisational climate captures the context in which workplace challenges and consequences are experienced and understood.⁸ The availability of organisational resources such as sufficient time, information, and materials, allows employees the capacity to perform job tasks and control their environment, in turn increasing empowerment.³¹ Previous studies in animal carer populations have supported this proposition, with increasing job control and organisational resources associated with reductions in burnout, exhaustion, and psychological distress, along with increases in work engagement.^{4, 32}

Job demands include critical incidents and daily hassles (routine job tasks). The accumulation and high frequency of these demands can increase vulnerability to adverse reactions to these events, lessen the ability to generate meaning from experiences, and lead to negative psychological symptoms.^{8, 33} In the context of animal care professionals, perceptions of high job demands have been associated with low job satisfaction and burnout.³²

Relationships with team members and leaders

Team members and leaders provide another valuable source of support in challenging work environments. Leaders possessing high-quality relationships with their teams can provide direction, and facilitate cultures of learning and trust.⁸ Positive team and leader relationships promote knowledge sharing and skill development to support employee competency.⁸ Support for these theories has been found in animal care professionals, who have reported that collegial support and sharing experiences are important in making sense of loss and challenges.³⁴ Cooperative animal care teams can increase job satisfaction and compassion satisfaction.^{35, 36} In contrast, perceived lack of support and toxic teams increase ratings of burnout, psychological distress, and low job satisfaction.^{32, 36} Therefore, quality relationships with leaders and teams can be expected to increase empowerment and resilience in animal care professionals.

Rationale and hypotheses

Animal care professionals are exposed to inevitable but significant stressors in their work.¹ To date, research in animal care professions

Hypothesised mediation model of predictors and outcomes

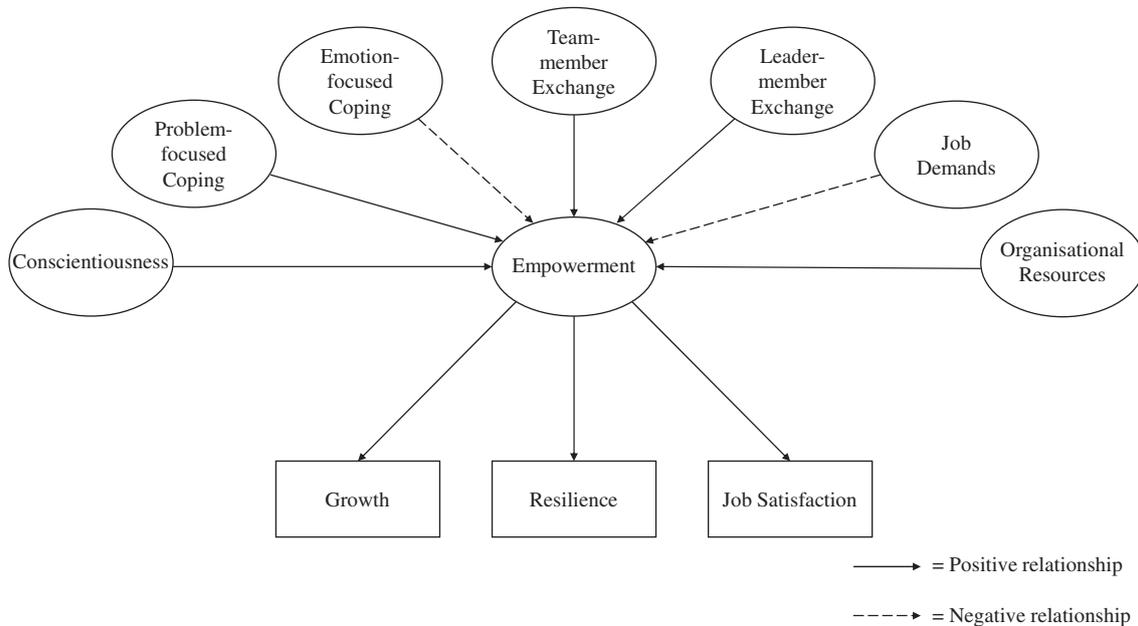


FIGURE 1. Hypothesised mediation model of predictors and outcomes.

has focused on these pathological outcomes, with few studies examining resilience or promotion of positive outcomes.³⁷ Further, the majority of research has examined personnel in veterinarian services, with few investigating the experiences of zookeepers, animal research technicians, animal rescuers or wildlife carers. The current research aimed to investigate the factors facilitating resilience in animal care professionals. The study explored the SSM’s potential to explain relationships between outcomes in resilience (as measured by resilience, growth, and job satisfaction) and the individual, interpersonal, and organisational factors in the context of animal care professions. Three hypotheses were proposed (Figure 1):

Hypothesis 1. *Conscientiousness, problem-focused coping, high-quality team and leader relationships, and organisational resources would have a positive relationship with outcomes in resilience, job satisfaction, growth, and empowerment.*

Hypothesis 2. *Emotion-focused coping and job demands would have a negative relationship with outcomes in resilience, job satisfaction, growth, and empowerment.*

Hypothesis 3. *Empowerment would mediate the relationship between predictive variables and outcomes.*

Measures

The Brief COPE (BCOPE)³⁸ measured the frequency of coping strategies used during stressful situations and consists of 14 subscales of 2 items each, on a 4-point scale from 0 (‘I haven’t been doing this at all’) to 3 (‘I’ve been doing this a lot’). Example item included ‘I’ve been learning to live with it’. Higher scores indicate a greater frequency of coping strategies used.

The Big Five Inventory-2³⁹ measured conscientiousness. Conscientiousness comprises 12 items on a 5-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly). An example item was ‘Is persistent, works until the task is finished’. Higher scores indicate higher levels of conscientiousness.

Team-Member Exchange⁴⁰ measured perceptions of relationships with colleagues. The measure comprises 10 items on a 5-point scale, an example item was ‘In busy situations, how often do other team members ask you to help out?’ Responses ranged from 1 (‘not at all’ or ‘rarely’) to 5 (‘fully’ or ‘very often’). Higher scores indicated perceptions of higher quality team-member exchanges and reciprocity.

Leader-Member Exchange⁴¹ measured perceptions of working relationships and leadership efficacy between workers and their workplace leaders. The scale comprises 7 items on a 5-point scale, an example item included ‘How well does your leader understand your job problems and needs? (How well do you understand)’. Responses ranged from 1 (‘not a bit’) to 5 (‘a great deal’). Higher scores indicate quality relationship exchanges between leaders and team members.

The Copenhagen Psychosocial Questionnaire II⁴² domains ‘demands at work’ (18 items) and ‘work organisation and job contents’ (17 items) were used to measure job demands and available

Materials and method

Participants

Participants were recruited to complete an online survey. Eligible participants currently or previously worked or volunteered in Australia or New Zealand animal care services. Participant demographics are shown in Table 1. Ethical approval was obtained from the Tasmanian Social Sciences Human Research Ethics Committee.



TABLE 1. Participant demographic information

Variable	N (%)
Country of residency	
Australia	331 (84)
New Zealand	62 (16)
Age in years	
18–24	36 (9)
25–34	152 (39)
35–44	99 (25)
45–55	60 (15)
55+	46 (12)
Gender	
Male	45 (11.5)
Female	346 (88)
Other	2 (0.5)
Occupation	
Animal attendant/kennel hand	12 (3.1)
Laboratory animal technician	50 (12.8)
Veterinarian	86 (21.9)
Veterinary nurse/technician	104 (26.5)
Wildlife carer	32 (8.2)
Zookeeper	64 (16.3)
Other	44 (11.2)
Years in current occupation	
Less than 2 years	31 (7.9)
2–4 years	75 (19.2)
5–7 years	67 (17.1)
8–10 years	44 (11.3)
11–20 years	107 (27.4)
21–30 years	37 (9.5)
30+ years	30 (7.7)
Current workplace	
Zoo or wildlife park	75 (19.1)
Research facility	56 (14.2)
Small animal veterinary practise	108 (27.5)
Large animal veterinary practise	8 (2.0)
Mixed animal veterinary practise	25 (6.4)
Emergency veterinary practise	25 (6.4)
Wildlife rescue organisation	39 (9.9)
Animal rescue organisation	25 (6.4)
Other	32 (8.1)
Years in current workplace	
Less than 2	83 (21.3)
2–4	114 (29.3)
5–7	64 (16.5)
8–10	44 (11.3)
11–20	67 (17.2)
21–30	10 (2.6)
30+	7 (1.8)

TABLE 1. Continued

Variable	N (%)
Current employment type	
Paid employee	338 (86.9)
Volunteer employee	51 (13.1)

N = 393.

organisational resources respectively. Items are scored on a 5-point Likert scale with anchors ranging either from ‘always’ to ‘never/hardly ever’, or ‘to a very large extent’ and ‘to a very small extent’. An example demands at work subscale item was ‘Do you have enough time for your work tasks?’ Higher scores in demands at work indicated high levels of cognitive, emotional, and physical job demands. An example work organisation and job contents subscale item were ‘Can you influence the amount of work assigned to you?’ Higher scores in the job contents and work organisations domain indicate greater influence, possibilities for development, variation, the meaning of work, and commitment to the workplace.

The Psychological Empowerment Instrument²⁰ was used to measure empowerment. The scale comprises 12 items on a 7-point Likert scale across four domains: meaning, competence, self-determination, and impact. Example item included ‘I am confident about my ability to do my job’. Responses ranged from 1 (very strongly disagree) to 7 (very strongly agree). Higher scores indicate higher psychological empowerment in the workplace context.

The Job Satisfaction Scale⁴³ measured overall job satisfaction in the current workplace. The measure consists of 36 items, responses were rated on a 6-point Likert scale ranging from 1 (disagree very much) to 6 (agree very much). An example item was ‘I feel a sense of pride in doing my job’. Higher scores indicate higher overall job satisfaction.

The Revised Stress-Related Growth Scale⁴⁴ is a 15-item scale used to measure changes in thoughts and behaviours following a negative event. Participants were asked to identify an event perceived as significantly negative. Sample item included ‘I experienced a change in the extent to which I find meaning in life’. Responses were rated on a 6-point bipolar response scale ranging from –3 (a very negative change) to +3 (a very positive change). Higher positive scores indicate personal growth following a negative event.

The Resilience Scale for Adults⁴⁵ measured resilience across intrapersonal and interpersonal domains. The scale consists of a total of 33 items rated on a 5-point scale ranging from 1 ‘I am uncertain about (My abilities)’ to 5 ‘I strongly believe in (My abilities)’. Higher scores indicate higher levels of individual resilience.

Analysis

A confirmatory factor analysis (CFA) was performed to confirm the fit of BCOPE items into problem and emotion-focused coping styles as proposed by Lazarus and Folkman.³⁰ Model fit measures of the CFA (Table 2) revealed a poor fit. Exploratory factor analyses found superior model fits and the final factors were labelled problem-approach coping (PAC), emotion-avoidant coping (EAC), and social

support coping (SSC). Items on religion and one item on substance use were removed due to poor fit and high intercorrelation, respectively.

One-way analysis of variances (ANOVAs) were conducted to determine if significant differences existed between demographic variables of residency, age, gender, occupation, or the number of years in current occupation in measures of resilience, stress-related growth, and job satisfaction. Where significant differences were found, regression analyses of relevant outcome measures were compared with and without demographic variables to identify if covariates contributed to a meaningful change to the overall models.

The number of participants provided insufficient power to conduct structural equation modelling when accounting for missing data and the anticipated size of coefficients.⁴⁶ Forced entry multivariate regressions using Baron and Kenny's⁴⁷ four-step method were conducted to determine if SSM explained relationships between predictor variables (coping styles, conscientiousness, team and leader exchanges, job demands, and organisational resources) and outcome variables (job satisfaction, growth, and resilience) and if relationships were mediated by empowerment. This regression approach was chosen as stepwise methods are considered less appropriate for multiple hypothesis testing and known to be problematic in creating bias.⁴⁸ Bootstrapping was performed to investigate the size and statistical significance of indirect effects detected by the regression analysis.

satisfaction. Significant differences were found between age, occupation, and years in occupation and outcomes measures (Table 4). Post-hoc tests using Tukey HSD were conducted on significant ANOVA results.

Resilience scores were found significantly ($P < 0.05$) higher in the Zookeeper ($M = 123.86$, $SD = 17.41$) occupation group than the Veterinary Nurse/Technician group ($M = 113.48$, $SD = 17.35$, Hedge's $g = 0.60$).

Stress-related growth scores were significantly ($P < 0.05$) higher in participants with less than two years worked in their current occupation ($M = 11.73$, $SD = 12.18$) compared to participants who had worked in their occupation 2–4 years ($M = -0.27$, $SD = 13.77$, Hedge's $g = 0.90$), 5–7 years ($M = 1.69$, $SD = 14.80$, Hedge's $g = 0.71$), 8–10 years ($M = 1.67$, $SD = 13.06$, Hedge's $g = 0.79$), and 11–20 years ($M = 1.06$, $SD = 14.58$, Hedge's $g = 0.76$). Although a significant difference was found between occupations and stress-related growth in the ANOVA results, post-hoc testing found these differences between groups were non-significant. As such, occupation was not included in regression analysis.

Results

A total of 716 participants accessed the online survey. Participants residing outside Australia and New Zealand or missing more than 20% of data⁴⁹ were excluded, and 15 outliers were removed. Outliers were identified as participants with standardised residuals exceeding ± 3 standard deviations. Final analyses included 393 participants. Occupations categorised as 'other' included staff involved directly in animal treatment and handling (e.g. foster carers), or as administrative support and training (e.g. volunteer coordinators). Current workplace classified as 'other' included participant responses such as working from home, within universities, or specialty clinics. Total scale means, standard deviations, and internal reliabilities of variables measured in the survey are represented in Table 3.

ANOVA analyses

One-way ANOVAs found residency and gender did not differ significantly in measures of resilience, stress-related growth, and job

TABLE 3. Means, standard deviations, and reliability of measures

Variable	M	SD	α
Conscientiousness	49.21	6.84	0.79
Coping ^a	32.37	11.58	0.86
Problem-approach ^a	13.06	4.92	0.83
Emotion-avoidant ^a	12.67	6.63	0.82
Social support ^a	5.36	3.10	0.87
Team-member exchange	35.40	5.52	0.75
Leader-member exchange	23.76	6.74	0.93
Job demands	1180.91	253.10	0.88
Organisational resources	1059.11	277.36	0.90
Empowerment	61.90	10.49	0.88
Resilience	118.26	17.03	0.88
Stress-related growth	2.09	14.09	0.94
Job satisfaction	134.73	29.21	0.94

^a Scale scores after exploratory factor analysis. α = Cronbach's alpha.

TABLE 2. Model fit of confirmatory and exploratory factor analyses of brief COPE

Model	χ^2	Df	P	RMSEA	TLI	BIC
CFA						
Two factors	3036.66	349	< 0.001	0.140	0.378	26879.53
EFA parallel						
Five factors	635.13	185	< 0.001	0.079	0.798	-470.03
EFA eigenvalues						
Three factors	1013.84	228	< 0.001	0.094	0.714	-348.19

Scale items. CFA, confirmatory factor analysis; EFA, exploratory factor analyses.

TABLE 4. Demographic group differences in resilience, stress-related growth, and job satisfaction measures

	Resilience			Stress-related growth			Job satisfaction		
	F	Df	P	F	Df	P	F	Df	P
Residency	0.82	(1, 391)	0.37	0.24	(1, 391)	0.63	0.51	(1, 391)	0.48
Age	0.62	(4, 388)	0.65	1.63	(4, 388)	0.17	5.97	(4, 388)	< 0.001
Gender	2.00	(2, 390)	0.31	0.04	(2, 390)	0.88	1.70	(2, 390)	0.44
Occupation	3.13	(6, 385)	0.01	2.33	(6, 385)	0.03	2.05	(6, 385)	0.06
Years in occupation	0.65	(6, 384)	0.69	3.10	(6, 384)	0.01	3.93 ^a	(6, 133.7)	0.001

^a Welch's ANOVA conducted due to unequal variances.

TABLE 5. Predictors problem-approach, emotion-avoidance, and social support coping, conscientiousness, team and leader exchange quality, job demands, and organisation resources on empowerment

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Constant	346.68	378.70		0.92	0.36	-397.92	1091.27
Problem-approach coping	25.16	10.55	0.10	2.39	0.02	4.42	45.91
Emotion-avoidant coping	-173.86	54.85	-0.14	-3.17	< 0.01	-281.71	-66.01
Social support coping	-27.13	16.84	-0.07	-1.61	0.11	-60.25	5.99
Conscientiousness	0.18	0.07	0.09	2.57	0.01	0.04	0.32
Team-member exchange	9.43	9.25	0.04	1.02	0.31	-8.76	27.62
Leader-member exchange	5.52	8.53	0.03	0.65	0.52	-11.25	22.28
Job demands	-0.00	0.00	-0.01	-0.18	0.85	-0.00	0.00
Organisational resources	2.94	0.21	0.64	14.09	< 0.001	2.53	3.35

Note. B, unstandardised beta coefficients; SE B, standard error of unstandardised beta coefficients; β , standardised beta coefficients; LL, lower limit; UL, upper limit.

TABLE 6. Empowerment, and Total effect of predictors on resilience

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Empowerment							
Constant	100.11	2.61		38.35	< 0.001	94.98	105.24
Empowerment	0.00	0.00	0.35	7.30	< 0.001	0.00	0.01
Total effect							
Constant	80.70	5.74		14.05	< 0.001	69.41	92.00
Problem-approach coping	0.62	0.16	0.18	3.86	< 0.001	0.30	0.93
Emotion-avoidant coping	-5.62	0.83	-0.34	-6.77	< 0.001	-7.25	-3.99
Social support coping	0.98	0.26	0.18	3.84	< 0.001	0.48	1.48
Conscientiousness	0.01	0.00	0.26	6.33	< 0.001	0.00	0.01
Team-member exchange	0.65	0.14	0.21	4.64	< 0.001	0.37	0.93
Leader-member exchange	-0.14	0.13	-0.06	-1.09	0.28	-0.39	0.11
Job demands	-0.00	0.00	-0.10	-2.25	0.03	-0.00	-0.00
Organisational resources	0.01	0.00	0.18	3.42	< 0.001	0.00	0.02

B, unstandardised beta coefficients; UL, upper limit; LL, lower limit; SE B, standard error of unstandardised beta coefficients; β , standardised beta coefficients.

Job satisfaction was significantly ($P < 0.05$) higher in the age group 55+ years ($M = 148.68$, $SD = 22.18$) compared to age groups 25–34 years ($M = 130.21$, $SD = 29.55$, Hedge's $g = 0.66$) and 35–44 years ($M = 129.15$, $SD = 29.81$, Hedge's $g = 0.71$). The age group 45–55 years ($M = 142.78$, $SD = 25.54$) was also found to have significantly higher scores in job satisfaction compared to age groups 25–34 years (Hedge's $g = 0.44$) and 35–44 years (Hedge's $g = 0.48$). Job satisfaction scores were also significantly ($P < 0.05$) higher in participants with less than 2 years worked in their occupation ($M = 149.01$, $SD = 25.09$) compared to participants who had worked in their occupation 5–7 years ($M = 131.00$, $SD = 28.48$, Hedge's $g = 0.66$) and 11–20 years ($M = 129.40$, $SD = 27.35$, Hedge's $g = 0.73$). Participants who had worked in their occupation 30+ years ($M = 145.19$, $SD = 18.55$) were also found to score higher than those who had worked between 11 and 20 years (Hedge's $g = 0.61$).

Regression analyses

Predictor variables accounted for a significant 52.8% of variance in empowerment, $F(8,384) = 55.81$, $P < 0.001$, with higher PAC, conscientiousness and organisational resources found to significantly increase empowerment. In contrast, higher EAC resulted in a significant decrease in empowerment (Table 5). Non-significant predictor variables were excluded from analyses of mediation and indirect effects on outcome variables.

The total effect of predictor variables on resilience significantly accounted for 39.3% of variance, $F(8,384) = 32.75$, $P < 0.001$. Inclusion of occupation as a covariate found a significant ($P < 0.01$) difference between models, with a 2.7% increase in explained variance. Although the inclusion of occupation found a statistically significant improvement, it was ultimately excluded as the increase in variance was not meaningful. Resilience was significantly and positively predicted by PAC, SSC, conscientiousness, team-member exchange,

and organisational resources. Increases in EAC and job demands significantly and negatively impacted resilience (Table 6). Empowerment significantly predicted a positive increase of resilience, explaining 11.9% of variance, $F(1, 391) = 53.79$, $P < 0.001$.

To compare total and indirect effects, two regressions were conducted to compare the coefficient and R^2 values of predictors of empowerment and resilience. The addition of empowerment did not significantly ($P = 0.47$) improve the model, with an increase in the explained variance of 0.09%. Standardised coefficients held similar values in both models, and empowerment became non-significant (Table 7). This indicates empowerment did not mediate relationships between predictors and resilience.

Predictors were found to significantly account for 19.8% of variance in stress-related growth, $F(8, 384) = 13.10$, $P < 0.001$. Inclusion of years in occupation found a significant ($P = 0.01$) difference between models and a 3.3% increase in explained variance. Years in occupation were excluded from the model, as the increase in variance did not meaningfully contribute to the overall model. Team-member exchange, PAC, and organisational resources significantly and positively predicted increases in stress-related growth. Increases in EAC and job demands had a significant and negative influence on stress-related growth (Table 8). Empowerment significantly explained 11.8% of variance in stress-related growth, $F(1, 391) = 53.43$, $P < 0.001$.

A comparison of total and indirect effects of empowerment and stress-related growth predictors revealed a significant ($P = 0.04$) difference between models, with a 1.0% increase in explained variance. Slight changes in the predictor coefficients indicated empowerment partially mediated the effect on stress-related growth (Table 9).

Bootstrapping set at 5000 replications was performed to test significance of indirect effects, scales were transformed into z-scores prior

TABLE 7. Total and direct effects of significant predictors and mediator on resilience

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Total effect							
Constant	91.34	5.16		17.69	< 0.001	81.19	101.49
Problem-approach coping	0.93	0.15	0.27	6.00	< 0.001	0.62	1.23
Emotion-avoidant coping	-5.25	0.77	-0.31	-6.85	< 0.001	-6.76	-3.75
Conscientiousness	0.01	0.00	0.27	6.47	< 0.001	0.01	0.01
Organisational resources	0.01	0.00	0.23	5.31	< 0.001	0.01	0.02
Direct effect							
Constant	90.96	5.19		17.52	< 0.001	80.76	101.17
Problem-approach coping	0.92	0.16	0.26	5.90	< 0.001	0.61	1.22
Emotion-avoidant coping	-5.14	0.78	-0.31	-6.57	< 0.001	-6.68	-3.60
Conscientiousness	0.01	0.00	0.27	6.31	< 0.001	0.00	0.01
Organisational resources	0.01	0.00	0.20	3.41	< 0.001	0.01	0.02
Empowerment	0.00	0.00	0.04	0.72	0.47	0.00	0.00

B, unstandardised beta coefficients; LL, lower limit; SE B, standard error of unstandardised beta coefficients; UL, upper limit; β , standardised beta coefficients.



TABLE 8. Empowerment, and total effect of predictors on stress-related growth

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Empowerment							
Constant	-12.91	2.16		-5.98	< 0.001	-17.15	-8.67
Empowerment	0.00	0.00	0.35	7.31	< 0.001	0.00	0.00
Total effect							
Constant	-13.05	5.47		-2.39	0.02	-23.80	-2.29
Problem-approach coping	0.30	0.15	0.11	1.99	0.05	0.00	0.60
Emotion-avoidant coping	-2.52	0.79	-0.18	-3.18	< 0.01	-4.08	-0.96
Social support coping	0.34	0.24	0.08	1.40	0.16	-0.14	0.82
Conscientiousness	0.00	0.00	-0.05	-1.11	0.27	0.00	0.00
Team-member exchange	0.29	0.13	0.12	2.21	0.03	0.03	0.56
Leader-member exchange	0.20	0.12	0.09	1.59	0.11	-0.05	0.44
Job demands	-0.00	0.00	-0.14	-2.62	0.01	-0.00	-0.00
Organisational resources	0.01	0.00	0.20	3.31	< 0.01	0.00	0.02

B, unstandardised beta coefficients; LL, lower limit; SE B, standard error of unstandardised beta coefficients; UL, upper limit; β , standardised beta coefficients.

TABLE 9. Total and direct effects of significant predictors and mediator on stress-related growth

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Total effect							
Constant	-6.63	4.78		-1.39	0.17	-16.03	2.76
Problem-approach coping	0.44	0.14	0.16	3.10	< 0.01	0.16	0.73
Emotion-avoidant coping	-3.00	0.71	-0.22	-4.23	< 0.001	-4.39	-1.61
Conscientiousness	-0.00	0.00	-0.05	-0.97	0.33	0.00	0.00
Organisation	0.01	0.00	0.29	5.98	< 0.001	0.01	0.02
Direct effect							
Constant	-7.60	4.78		-1.59	0.11	-17.00	1.81
Problem-approach coping	0.41	0.14	0.14	2.88	< 0.01	0.13	0.70
Emotion-avoidant coping	-2.70	0.72	-0.20	-3.75	< 0.001	-4.12	-1.28
Conscientiousness	0.00	0.00	-0.06	-1.24	0.21	0.00	0.00
Organisational resources	0.01	0.00	0.20	2.97	< 0.01	0.00	0.02
Empowerment	0.00	0.00	0.14	2.07	0.04	0.00	0.00

B, unstandardised beta coefficients; LL, lower limit; SE B, standard error of unstandardised beta coefficients; UL, upper limit; β , standardised beta coefficients.

to analysis. Results found the indirect effects of PAC ($B = 0.01$, $P = 0.22$, 95% CI [-0.01, 0.03]), EAC ($B = -0.02$, $P = 0.07$, 95% CI [-0.05, < 0.01]), and conscientiousness ($B = 0.01$, $P = 0.09$, 95% CI [< -0.01 , 0.03]) were non-significantly related to stress-related growth via empowerment. Organisational resources ($B = 0.10$, $P = 0.05$, 95% CI [< 0.01 , 0.20]) was found to be significantly and positively related to increases in stress-related growth via empowerment.

Total effect of predictors on job satisfaction found a significant variance of 67.1%, $F(8, 384) = 99.81$, $P < 0.001$. The addition of age and years in occupation found a non-significant ($P = 0.31$) increase in the

explained variance of 1.0%, these demographics were therefore excluded from the model. Increases in leader-member exchange and organisational resources significantly and positively predicted increases in job satisfaction. Higher conscientiousness and job demands significantly predicted decreases in job satisfaction (Table 10). Empowerment significantly predicted an increase in job satisfaction, accounting for 18.7% variance, $F(1, 391) = 91.00$, $P < 0.001$.

Comparison between total and indirect effects of empowerment and job satisfaction predictors found a non-significant ($P = 0.17$) change between models, with an increase in explained variance by 0.3%.

TABLE 10. Empowerment and Total effect of predictors on job satisfaction

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Empowerment							
Constant	95.78	4.29		22.31	< 0.001	87.34	104.22
Empowerment	0.01	0.00	0.43	9.54	< 0.001	0.01	0.01
Total effect							
Constant	69.45	7.27		9.55	< 0.001	55.15	83.76
Problem-approach coping	-0.01	0.20	0.00	-0.06	0.96	-0.41	0.39
Emotion-avoidant coping	0.31	1.05	0.01	0.29	0.77	-1.77	2.38
Social support coping	0.25	0.32	0.03	0.78	0.43	-0.38	0.89
Conscientiousness	0.00	0.00	-0.06	-2.08	0.04	-0.01	-0.00
Team-member exchange	0.17	0.18	0.03	0.95	0.35	-0.18	0.52
Leader-member exchange	1.72	0.16	0.40	10.48	< 0.001	1.40	2.04
Job demands	-0.00	0.00	-0.31	-9.02	< 0.001	-0.00	-0.00
Organisational resources	0.04	0.00	0.41	10.77	< 0.001	0.04	0.05

B, unstandardised beta coefficients; LL, lower limit; SE B, standard error of unstandardised beta coefficients; UL, upper limit; β, standardised beta coefficients.

TABLE 11. Total and direct effects of significant predictors and mediator on job satisfaction

	B	SE B	β	t	P	95% CI for B	
						LL	UL
Total effect							
Constant	82.53	8.12		10.17	< 0.001	66.57	98.48
Problem-approach coping	0.24	0.24	0.04	0.98	0.33	-0.24	0.72
Emotion-avoidant coping	-3.77	1.20	-0.13	-3.13	< 0.01	-6.13	-1.40
Conscientiousness	0.00	0.00	-0.07	-1.76	0.08	-0.01	0.00
Organisational resources	0.07	0.00	0.62	15.69	< 0.001	0.06	0.07
Direct effect							
Constant	83.63	8.15		10.27	< 0.001	67.61	99.65
Problem-approach coping	0.27	0.24	0.05	1.11	0.27	-0.21	0.75
Emotion-avoidant coping	-4.10	1.23	-0.14	-3.34	< 0.001	-6.52	-1.69
Conscientiousness	0.00	0.00	-0.06	-1.55	0.12	-0.01	0.00
Organisational resources	0.07	0.01	0.67	12.48	< 0.001	0.06	0.08
Empowerment	0.00	0.00	-0.08	-1.37	0.17	0.00	0.00

B, unstandardised beta coefficients; LL, lower limit; SE B, standard error of unstandardised beta coefficients; UL, upper limit; β, standardised beta coefficients.

Coefficients held similar values, and empowerment was found to be a non-significant predictor (Table 11). This indicates empowerment did not mediate relationships between predictors and job satisfaction.

professionals. In addition, this study found partial support for psychological empowerment as the mechanism facilitating individuals to draw upon resources and experience positive outcomes.

Discussion

Results found partial support for the SSM’s description of relationships between the individual, interpersonal, and organisational factors and outcomes in resilience, growth, and job satisfaction in animal care

Individual factors

The positive relationship between conscientiousness and resilience was consistent with the SSM and has been demonstrated in earlier studies²⁷ The negative relationship between conscientiousness and job satisfaction was not anticipated, as this relationship has been

previously found to be positive.⁵⁰ However, as noted by Judge et al.⁵⁰ the relationship between conscientiousness and job satisfaction may vary according to occupations and required behaviours within job roles. This may also be true of the relationship between conscientiousness and growth. Higher conscientiousness has been found positively related to growth following traumatic events in ambulance personnel.²⁸ However, the present study found conscientiousness contributed to a non-significant change in stress-related growth. This finding is not unusual, as earlier research on human health care providers has also revealed non-significant relationships.¹⁷ Inconsistency of findings between occupations suggests other workplace factors may be moderating outcomes. Given the nature of animal care services and their unique experiences with uncontrollable situations of animal pain and death,⁶ other dispositions may be more influential than tendencies of conscientiousness toward self-control and goal achievement in this population.^{13, 51}

PAC styles were positively correlated with resilience and growth, whilst emotion-avoidant styles were negatively correlated. Findings were as expected and resemble overall patterns of coping and adaptation seen in previous research. Strategies focused on avoiding stressors and alleviating distressing emotions are detrimental to wellbeing, whilst reappraisal and problem-solving promote adaptation.^{15, 29} Animal care professionals actively engaging with sources of stress and adverse situations may be more likely to experience resilience and growth, whilst disengagement and withdrawal may result in a decrease in these outcomes.

The positive relationship between SSC styles and resilience was not surprising, as resilient individuals are able to draw on family and friends for support.⁴⁵ The lack of relationship with growth was contrary to earlier research.^{14, 15} Given it is the quality of relationships rather than the presence of social supports that aids growth,¹⁶ future research may benefit from exploring the quality of animal carer's social supports. As reported by animal laboratory technicians and veterinary staff, public perceptions of animal care and euthanasia can deter discussion of distressing events outside the workplace.^{3, 32} Due to the nature of their work, and as suggested by the findings of this study, quality workplace relationships may be more valuable for an animal care professional's ability to generate meaning and manage adverse events.

Interpersonal factors

As anticipated by the SSM, quality team relationships predicted increases in growth and resilience. Sharing stressors and emotions with others assists in generating meaning, expanding coping strategies, and supporting individual self-efficacy.⁵² Animal care professionals have previously identified support from their teams as beneficial in processing difficult experiences and loss.³⁴ Furthermore, when responsibility for resolution and acceptance of challenges are shared, the individual burden is lessened.¹⁶ This contrasts with previous findings where toxic team environments in veterinary staff were associated with increases in burnout, psychological distress, and exhaustion.^{32, 35} Combined with findings from the present study, this indicates team relationships may promote resilience and growth, whilst protecting against burnout and distress in animal care professionals.

While team relationships predicted positive increases in growth and resilience, relationship quality between leaders and team members did not predict significant changes in these outcomes. This result was not anticipated, as sharing distressing information and seeking support has been found to occur when subordinates perceive a high quality and reciprocal relationship with their leaders.⁵³ Future research could explore animal care professional's perceptions of repercussions when using supervisors as a resource and disclosing distress, as previous studies have shown this to be a deterrent in other working populations.^{31, 53} The present study found leader-member relationships positively predicted increases in job satisfaction. This result aligns with the SSM and earlier research in human health care organisations, where confidence in leaders and staff members was related to increased satisfaction.¹⁷

Organisational factors

Organisational resources positively predicted increases in resilience, growth, and job satisfaction. Conversely, increasing job demands predicted decreases in resilience, growth, and job satisfaction. All relationships functioned in directions anticipated by the SSM. Organisations guide expectations and normalise behaviours and emotional responses of their staff,⁵⁴ shaping schemas on stressor appraisal and future adaptive capacity.²¹ Findings from the current study are comparable to previous research examining the balance between job demands and resources in animal care occupations. Increasing job demands have been associated with an increased risk of animal care professionals experiencing pathological outcomes, such as compassion fatigue, burnout, and emotional exhaustion.^{4, 55} Veterinary staff have noted high work pace limits opportunities and control in processing emotionally distressing incidences, resulting in emotional suppression to continue with work tasks.² Demanding environments have also been identified as increasing the risk of potentially fatal errors, thus endangering animal care professionals to experience further distress.^{2, 56}

Availability of resources has previously been found to have an opposing effect, lowering exhaustion and improving work engagement in animal care.⁴ Opportunities to improve technical skills have been identified in earlier studies as valuable for animal care professionals, as it restores confidence in competency following complications or adverse outcomes during animal care.⁵⁶ Combined with findings from this study, it can be argued workplace interventions targeting staff workload and resources may have a dual impact, supporting resilience and reducing pathological risk.

Empowerment

The SSM proposed empowerment as the underlying mechanism enabling individuals to draw upon available resources and translate their workplace encounters into meaningful, coherent, and manageable experiences.⁸ A small but significant indirect effect was found for organisational resources via empowerment on stress-related growth. This suggests animal care workplaces can encourage employee empowerment through the provision of resources, such as skill development and workload control, which in turn will support personal growth. However, the small coefficient and confidence intervals close to zero should be considered when interpreting the meaningfulness of this relationship. The finding that empowerment did not mediate relationships between predictors and outcomes in

resilience and job satisfaction diverged from expectations of the SSM and earlier research.^{22, 23} A possibility for the unanticipated results may be due to the unique challenges faced by animal care professionals compared to other working populations, such as lack of control and choice in animal treatments and euthanasia.^{2, 6}

Limitations and future directions

Several limitations present in this study may influence the interpretations and generalisability of findings. First, survey data was collected during the COVID-19 pandemic. Public health recommendations and restrictions saw many animal care services depart from normal operating procedures. Additionally, social supports within and outside of the workplace were limited due to health and safety policies. As such, the work environment of the study's population was unusual, limiting generalisability of findings from this study to a context outside of a pandemic situation. However, it does provide a perspective of outcomes and predictors in this population during an ambiguous and novel time.

Another limitation is the minimal comparison between occupations, residency, and gender. One of the study's aims was to capture experiences across a range of animal care occupations as many are presently understudied, such as animal laboratory technicians, wildlife carers, and zookeepers. While these occupations hold similarities, there are likely substantial variations in job tasks and stressors between workplaces. For example, many wildlife carers often work independently or have limited contact with colleagues and supervisors.⁵⁷ As identified in this study, there also appears to be an influence of age and number of years in the occupation, suggesting life stages and experience contribute to differences in adaptability and satisfaction in animal care professions. Similarly, experiences between Australian and New Zealand employees may vary due to national regulations and cultural differences. Furthermore, participants of this study predominantly identified as female, as indicated by earlier research in veterinarians,⁷ experiences of workplace demands and resources in animal carers may vary according to gender. Overall, the understanding of animal care professionals' experiences and resilience would benefit from cultural, gender, and occupational comparisons.

For stress-related growth to occur, a significant and subjectively stressful event is required as a catalyst.¹³ In the current study, the presence of a significant stressor was not confirmed, consequently, some caution is warranted in interpreting findings of growth. Future research with animal carer populations may benefit from longitudinal research designs to capture baseline functioning prior to an event and the development of growth over time.⁴⁴

To strengthen confidence in the findings of the present study, replication and further investigation into supporting resilience in animal care professions are required. Participant fatigue may also need to be considered in future research, as the length of the survey and measurements used in the present study may have influenced engagement levels. Further research would also likely benefit from the investigation of the unique experiences of animal care professionals compared to other professions,² as they may influence relationships between individual, interpersonal, and organisational factors and outcomes in resilience.

Implications

Results from the current study indicate that much like human service providers, promoting outcomes in resilience for animal care professionals requires multifaceted approaches.⁸ To date, there has been a paucity of research into the efficacy and impacts of interventions in the animal care workplace.⁵⁸ Furthermore, in the intervention studies, the focus has been on individual-level intervention techniques, such as improving self-awareness, psychoeducation, and stress reduction (i.e., breathing techniques and yoga).⁵⁸ Results from the present study indicate future research, interventions, and prevention strategies would benefit from considering features of interpersonal workplace interactions and organisational climate, along with the individual in their designs.

Animal care professionals may benefit from evaluating current coping strategies and adjusting their styles to increase responses of positive reappraisal, problem-solving, and acceptance. Reduction of avoidance, disengagement from stressors, and use of emotional diffusion may additionally be beneficial. However, organisations also influence the individual selection of coping strategies.³¹ Organisations supporting individual training, development, and workplace control have been found to encourage employees to utilise problem-solving coping strategies over emotion mitigation strategies, resulting in more positive work experiences and improved wellbeing.^{15, 59} Encouraging quality exchanges between leaders and staff can also support individuals to derive satisfaction from their workplace.

Organisations wanting to support their animal care staff may need to examine the balance between work demands and available resources. As identified in the present study, workplace demands and resources predicted variations across outcomes in growth, resilience, and job satisfaction. Ensuring the availability of job resources, such as opportunities to develop skills and control workloads, has previously been found to assist in managing demanding job tasks.^{4, 32} Workplaces have also been previously identified to further aid stress management through monitoring of work hours and workloads of their staff, and provide support in meeting and managing expectations from human clients and outcomes in animal care.⁷

Conclusions

The SSM explained several relationships between individual, interpersonal, and organisational factors and outcomes in resilience in animal care professionals. However, contrary to the SSM, this study indicated empowerment does not fully facilitate individual's capacity to draw upon resources in the context of animal care professions.

Findings from this study have implications for supporting resilience and wellbeing in animal care professionals. Future research, interventions, and prevention strategies would benefit by incorporating multi-dimensional approaches to address the individual, interpersonal, and organisational factors supporting resilience.

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