



Anxiety and its relationship to demographic and personality traits data among special operations divers: a cross-sectional study

Houyu Zhao, Y Wen, K Liang, J Huang, Y Fang

Naval Medical University,
Shanghai, China

Correspondence to
Professor Y Fang;
1287225836@qq.com

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ABSTRACT

Introduction Special operation diving is becoming increasingly prevalent but has received less attention. The anxiety profile in special operation divers and its influencing factors remain unclear, posing great challenges to medical and psychological security of this unique population. The current study aimed to investigate the anxiety profile and to analyse the correlations between anxiety with demographic and personality traits data among special operation divers.

Methods From July to October 2023, 650 special operation divers participated this analytical cross-sectional study. The Spielberg's State-Trait Anxiety Inventory and the Neuroticism Extraversion Openness Five-Factor Inventory were used to evaluate anxiety and personality traits of special operation divers.

Results 27.2% and 30.3% special operation divers showed high scores on state anxiety and trait anxiety, respectively. Special operation divers who are 30 years or older and who have dived for 15 years or more are prone to higher level of trait anxiety and state anxiety (all $p < 0.001$). Neuroticism showed a significantly positive correlation with both trait anxiety ($r = 0.675$, $p < 0.001$) and state anxiety ($r = 0.674$, $p < 0.001$). Extraversion, openness, agreeableness and conscientiousness are all negatively correlated with both trait anxiety and state anxiety ($r = -0.670$ to -0.400 , all $p < 0.001$). Additionally, significant differences in neuroticism, extraversion, openness, agreeableness and conscientiousness were observed between the high anxiety group and the low anxiety group (all $p < 0.001$).

Conclusion The prevalence of trait anxiety and state anxiety are both relatively high among special operation divers. Individuals with older age and longer diving years are more prone to be anxious. Higher neuroticism, lower extraversion, lower openness, lower agreeableness and lower conscientiousness may be predictors of higher trait anxiety and higher state anxiety.

INTRODUCTION

Special operation divers are highly trained individuals who perform underwater operations in support of underwater construction, law enforcement or other specialised missions.¹ They may be involved in a wide range of activities, including reconnaissance, underwater demolition, combat swimming, sabotage and recovery operations. These divers undergo rigorous training to develop the skills and capabilities required for their demanding roles. Compared with sports and recreational divers, they often work in more complex environments, with more difficult

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Anxiety is a good predictor of panic behaviour and motor impairment, which are the two most common factors contributing to diving accidents.
- ⇒ The relationship between anxiety symptoms and personality traits has been investigated in many occupational populations.

WHAT THIS STUDY ADDS

- ⇒ Special operation divers were the major subjects of this study.
- ⇒ The anxiety of special operation divers and its influencing factors were investigated.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ Both prevalence of trait anxiety and state anxiety are relatively higher in special operation divers.
- ⇒ Special operation divers who are 30 years or older or who have dived for more than 15 years are prone to anxiety.
- ⇒ Individuals with certain personality traits are unsuitable for special operation diving.

tasks and often unmanageable hours of operation. In addition, the tasks performed by special operation divers often require exceptional physical fitness, proficiency in diving techniques and the ability to operate effectively in challenging and often hostile environments. There is no doubt that special operation diving is much more physically and cognitively demanding. Thus, a sound emotional state is also essential for the successful and safe completion of special underwater operations.

Anxiety is a negative emotional experience induced by stress and can be exacerbated by equipment problems, poor physical conditions or psychological factors. Anxiety symptoms refer to excessive nervousness-related emotional and behavioural responses (eg, avoidance) and related cognitive patterns.² DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition), published by the American Psychiatric Association (APA), is the authoritative guide for the classification and diagnosis of mental disorders. According to the DSM-5, under certain conditions, anxiety symptoms may be linked to medical conditions, causing poorer physical health.³ Previous studies suggested that anxiety is a substantial consideration in diving. Research found that anxiety among divers can lead



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to declines in cognitive functions such as memory, attention and reaction speed in underwater environments, ultimately affecting their operational capabilities during dives.^{4–6} In addition, in underwater environment, among divers, anxiety influences motor skills^{7–9} and is a good predictor of panic behaviour.^{10–12} Motor impairment and panic are the two most common factors contributing to diving accidents. Considering the adverse impact of anxiety on divers' personal health and operating capability, it is necessary to understand the profile of anxiety among underwater special divers.

Personality is defined as 'a set of points falling along several behavioral dimensions, each corresponding to a trait, resulting in a unique profile, different from that of other individuals'.¹³ Research linking personality to behaviours has relied heavily on trait theory.¹⁴ Traits were believed to reside in the individual and to cause and effect behaviours when activated.¹⁵ The Five-Factor Model (FFM), which has emerged as the dominant framework for studying personality, was used in this research.¹⁵ According to the FFM, personality results from the combination of five key traits, often called the 'Big Five,' which include Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness.¹⁶ Numerous studies have investigated the relationship between personality traits and anxiety symptoms, while information about anxiety and personality traits, as well as their relationship in special operation divers, has been sparsely documented. Furthermore, the Big Five represents personality traits that usually precede the symptoms of anxiety, they are considered risk/protective factors for anxiety.¹⁷ Since personality traits are relatively stable and easy to measure, awareness of the relationship between anxiety and personality traits of special operation divers may be useful for the screening and selection of special operation divers.

The current study aimed (1) to investigate the anxiety and personality profile of special operation divers; and (2) to explore the relationship between anxiety and personality traits of special operation divers.

MATERIALS AND METHODS

Study design and participants

From July to October 2023, a cross-sectional study was carried out. The criteria for inclusion in the study group were as follows: 18–50 years old; being physically healthy; being engaged in the profession of special underwater operation. The criteria for exclusion in the study group were as follows: without explicit consent; with incomplete questionnaire responses; with neurological impairments; using medications or psychoactive substance known to influence neurological function/status and/or mood function/status. A total of 650 special operation divers were randomly selected and invited to take part in this analytical cross-sectional study and complete a questionnaire. The questionnaire asked about demographics including age, education level and diving years, anxiety levels and personality traits.

Data collection

All experimental procedures in this study were performed in accordance with the Declaration of Helsinki and approved by Naval Medical University. All subjects provided written informed consent before the initiation of the experiment. The study was conducted using a direct pen-and-paper interview method in the workplace of the studied special operation divers. Clear instructions on how to complete the questionnaire were given to participants and they were assured of the confidentiality of their responses.

Key measures

Anxiety

The Spielberg's State-Trait Anxiety Inventory (STAI) was applied to evaluate anxiety¹⁸ and has been used among divers.⁴ In the STAI, higher scores indicate greater anxiety. Each item is rated on a scale of 1 to 4, with a rating of 4 indicating the presence of high levels of anxiety for certain items. The scoring weights for items without anxiety are reversed. The participants were categorised into two groups for anxiety based on their total scores: low (<39) and high (≥39).

Personality traits

The Neuroticism Extraversion Openness Five-Factor Inventory (NEO-FFI) personality questionnaire was used to determine personality traits using the Big Five model.¹⁹ The NEO-FFI consists of 60 self-descriptive statements, which are evaluated by respondents on a five-point scale for their accuracy. The questionnaire includes 5 domains and 12 statements in each subscale. The higher the scores on the subscales, the more indicative they are of the corresponding personality traits.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics V.27.0 software by means of descriptive and analytic statistics. Means and SD were calculated for all variables. The normal distribution of numerical data was evaluated through the Shapiro-Wilk's test. Unpaired two-tailed Student's t-test was used for two-group comparisons, and one-way Analysis of Variance (ANOVA) followed by Least Significant Difference (LSD) multiple comparisons test was used for three-group or more-group comparisons. The relationships between personality traits and anxiety were measured using the Pearson's correlation test. Statistical significance was set at $p < 0.05$. All results were double-checked to ensure accuracy and reliability.

Table 1 Participants' characteristics (n=580)

Demographic variables	n	%
Age (years), M±SD = 26.35±5.03; min–max 19–46		
<25	255	44.0
25–29	189	32.6
≥30	136	23.4
Education level		
1 (high school or vocational school)	190	32.8
2 (associate degree)	257	44.3
3 (bachelor's degree)	133	22.9
Length of diving (years), M±SD = 7.61±5.81 years; min–max 1–29		
<5	255	44.0
5–9	100	17.2
10–14	132	22.8
≥15	92	15.9
State anxiety		
Low	422	72.8%
High	158	27.2%
Trait anxiety		
Low	404	69.7%
High	176	30.3%

Table 2 Descriptive statistics of STAI and NEO-FFI scores of special operation divers

Variables	Lowest score	Highest score	Mean	SD
State anxiety	20	66	32.83	9.53
Trait anxiety	20	71	34.28	9.11
Neuroticism	16	50	28.58	6.33
Extraversion	23	60	45.59	6.76
Openness	25	57	41.56	5.48
Agreeableness	18	58	43.43	6.01
Conscientiousness	30	60	48.27	6.81

NEO-FFI, Neuroticism Extraversion Openness Five-Factor Inventory; STAI, Spielberg's State-Trait Anxiety Inventory.

RESULTS

Demographic characteristics

Characteristics of the study population were presented in [table 1](#). A total of 620 special operation divers participated in this study, with 580 completing the questionnaire. Of them, 44.0% were younger than 25 years old, 32.6% were between 25 and 29 years old, and 23.4% were older than 30 years old. The mean±SD age presented was 26.35±5.03 years old. As to education, 32.8% were high school or vocational school, 44.3% were associate degree and 22.9% were bachelor's degree. In addition, 44.0% have dived for no more than 5 years, 17.2% have dived for 6~9 years, 22.8% have dived for 10~14 years and 15.9% have dived for more than 15 years. The mean±SD diving years presented was 7.61±5.81 years.

Anxiety and personality

[Table 2](#) shows general findings of participants' STAI and NEO-FFI scores. The SA score, TA score, Neuroticism score, Extraversion score, Openness score, Agreeableness score and Conscientiousness score of participants were 32.83±9.53, 34.28±9.11, 28.58±6.33, 45.59±6.76, 41.56±5.48, 43.43±6.01 and 48.27±6.81, respectively. According to the STAI data, 27.2% and 30.3% showed high scores on state anxiety and trait anxiety, respectively ([table 1](#)).

Anxiety scores related to age and length of diving

The correlation of the STAI with demographic data among the population of underwater special operators is presented in [table 3](#). There were significant differences in participant STAI scores concerning age and length of diving of participants. There was statistically significant difference in trait anxiety and state anxiety scores for the three age groups (<25, 25~29, >30): $F(2, 577)=11.151$, $p<0.001$, $F(2, 577)=11.204$, $p<0.001$, respectively. Post hoc comparisons using the LSD test demonstrated that the mean score of trait anxiety for those older than 30 years old (37.43 ± 7.07) were significantly higher than those younger than 25 years old (33.11 ± 10.94 , 95% CI 2.46, 6.19) and those between 25 and 29 years old (33.60 ± 6.98 , 95% CI 1.86, 5.81). Besides, the mean score of state anxiety for those older than 30 years old (36.15 ± 7.57) was significantly higher than those younger than 25 years old (31.81 ± 11.34 , 95% CI 2.39, 6.30) and those between 25 and 29 years old (31.80 ± 7.37 , 95% CI 2.28, 6.42). As for length of diving, there were statistically significant difference in trait anxiety and state anxiety scores for the five groups (<5, 5~9, 10~14, ≥15): $F(3, 576)=6.654$, $p<0.001$, $F(3, 576)=6.650$, $p<0.001$, respectively. Those who have dived for more than 15 years (37.93 ± 6.16) scored significantly higher in trait anxiety than those who have dived for less than 5 years (33.11 ± 10.94 , 95% CI 2.68, 6.97), 5~9 years (33.73 ± 7.81 , 95% CI 1.66, 6.75) and 10~14 years (34.42 ± 7.07 , 95% CI 1.11, 5.91). Similarly, those who have dived for more than 15 years (36.75 ± 6.63) scored significantly higher in state anxiety than those who have dived for less than 5 years (31.81 ± 11.34 , 95% CI 2.69, 7.18), 5~9 years (31.93 ± 8.23 , 95% CI 2.16, 7.48) and 10~14 years (32.74 ± 7.51 , 95% CI 1.50, 6.51). However, there were no significant differences in participant trait anxiety and state anxiety scores for three education levels, $F(2, 579)=0.772$, $p=0.462$, $F(2, 579)=0.194$, $p=0.834$, respectively. Taken together, special operation divers who are 30 years or older and who have dived for 15 years or more are prone to higher level of trait anxiety and state anxiety.

Anxiety scores related to personality traits

The correlation between anxiety symptom scores with personality traits among the population of underwater special operators are presented in [tables 4 and 5](#). Scores of five dimensions of NEO-FFI are all significantly correlated with trait anxiety and

Table 3 Relationship between demographic characteristics and anxiety

Variables	Trait anxiety			State anxiety		
	M±SD	F	P value*	M±SD	F	P value*
Age		11.151	0.000		11.204	0.000
Group 1 (<25)	33.11±10.94			31.81±11.34		
Group 2 (25~29)	33.60±6.98			31.80±7.37		
Group 3 (≥30)	37.43±7.07		3>1, 3>2	36.15±7.57		3>1, 3>2
Education level		0.772	0.462		0.194	0.824
Group 1 (1)	33.61±9.77			32.49±10.02		
Group 2 (2)	34.58±8.86			33.06±9.39		
Group 3 (3)	34.67±8.63			32.85±9.14		
Length of diving		6.645	0.000		6.650	0.000
Group 1 (<5)	33.11±10.94			31.81±11.34		
Group 2 (5~9)	33.73±7.81			31.93±8.23		
Group 3 (10~14)	34.42±7.07			32.74±7.51		
Group 4 (≥15)	37.93±6.16		4>1, 4>2, 4>3	36.75±6.63		4>1, 4>2, 4>3

*One-way analysis of variance.

Table 4 Relationship between anxiety and personality traits of special operation divers

Variables	Trait anxiety		State anxiety	
	R	P value*	R	P value*
Neuroticism	0.675*	0.000	0.674*	0.000
Extraversion	-0.670*	0.000	-0.664*	0.000
Openness	-0.402*	0.000	-0.400*	0.000
Agreeableness	-0.479*	0.000	-0.482*	0.000
Conscientiousness	-0.666*	0.000	-0.663*	0.000

*Pearson's correlation test; r, r index: <0.2—trivial, 0.2 to <0.4—weak, 0.4 to <0.6—moderate, 0.6 to <0.8, strong, 0.8 to 1—very strong.

state anxiety. Trait anxiety showed a significantly positive correlation with neuroticism ($r=0.675$, $p<0.001$) and a significantly negative correlation with extraversion ($r=-0.670$, $p<0.001$), openness ($r=-0.402$, $p<0.001$), agreeableness ($r=-0.479$, $p<0.001$) and conscientiousness ($r=-0.666$, $p<0.001$). Similarly, state anxiety was positively associated with neuroticism ($r=0.674$, $p<0.001$) and negatively with all other traits: extraversion ($r=-0.664$, $p<0.001$), openness ($r=-0.400$, $p<0.001$), agreeableness ($r=-0.482$, $p<0.001$) and conscientiousness ($r=-0.663$, $p<0.001$), as listed in [table 4](#).

Finally, to further investigate the relationship between anxiety and personality traits, participants were categorised into high-score and low-score groups based on their scores for trait anxiety and state anxiety. We then proceeded to compare the scores for each personality trait between these two groups. The results revealed that special operation divers with higher levels of trait anxiety exhibited significantly higher levels of neuroticism compared with those with lower levels of trait anxiety (95% CI -8.83 to -7.00, $p<0.001$). Additionally, participants with higher levels of trait anxiety scored significantly lower in extraversion (95% CI 6.89, 8.91, $p<0.001$), openness (95% CI 2.67, 4.52, $p<0.001$), agreeableness (95% CI 4.39, 6.33, $p<0.001$) and conscientiousness (95% CI 7.35, 9.34, $p<0.001$) compared with those with lower levels of trait anxiety. Similarly, significant differences were observed between the high state anxiety group and the low state anxiety group. Special operation divers with higher levels of state anxiety showed significantly higher levels of depression and neuroticism compared with those with lower levels of state anxiety (95% CI -8.97 to -7.05, $p<0.001$). Furthermore, participants with higher levels of state anxiety scored significantly lower in extraversion (95% CI 7.12, 9.21, $p<0.001$), openness (95% CI 2.72, 4.63, $p<0.001$), agreeableness (95% CI 4.39, 6.41, $p<0.001$) and conscientiousness (95% CI 7.52, 9.59, $p<0.001$) compared with those with lower levels of state anxiety, as listed in [table 5](#).

DISCUSSION

To the best of our knowledge, this study represents the first attempt to investigate the anxiety profile and its influencing factors among the population of special operation divers. Our main findings are as follows.

First, the current study has investigated the profile of anxiety and personality traits of the special operation divers. According to our investigation, 27.2% and 30.3% showed high scores on state anxiety and trait anxiety, respectively. Few data are available on the prevalence of mental health conditions among divers, apart from the two studies that showed that the prevalence of anxiety in navy divers and sport divers is similar to or even less than the general UK population.^{20 21} Therefore, it can be said that the prevalence of anxiety in the special operation divers is relatively higher and deserves attention. As has been mentioned earlier, special operation diving is a more risky, difficult and arduous occupation compared with conventional diving. Therefore, it is understandable that they experienced higher anxiety levels. In addition, special operation divers tend to experience or witness more occurrence of accidents or even fatalities, which further predisposes them to anxiety. Available evidence suggests that anxiety is a substantial consideration in diving and may exert significant effect on a diver's performance and safety. Therefore, higher levels of anxiety among special operation divers are of great concern.

Our research further explored the relationship between demographic and personality traits data with anxiety, aiming to provide some recommendations for the safety and security of underwater special divers. According to our investigation, special operation divers who are 30 years or older and who have dived for 15 years or more are prone to higher level of trait anxiety and state anxiety. The relationship between anxiety levels and age and years of diving seems reasonable. Factors including workplace stress, sensitive and critical situations, high job responsibilities, job stress, problems in the family and home, economic burdens, confusion about future career development, lack of confidence in individual abilities, physical and psychological fatigue caused by long-term hard and dangerous work, thinking the possibility of accidents and death are some of the causes of anxiety. In addition, prolonged diving activities can cause some physical symptoms such as middle ear barotrauma,²² lung barotrauma,²³ bone and muscle aches and pains,²⁴ etc. Physical discomfort can easily lead to psychological discomfort, thus making special operation divers with longer diving years prone to anxiety. The relationship between anxiety levels with age and length of diving in special operation divers suggests that we need to pay particular attention to the emotional state of older divers with more years of diving experience. In addition to career-related factors, their emotional state may be influenced by several other factors that make them more susceptible to anxiety.

Table 5 Difference of personality traits between the high-score and the low-score anxiety groups

Variables	Trait anxiety			State anxiety		
	Low (n=404)	High (n=176)	P value*	Low (n=422)	High (n=158)	P value*
Neuroticism	26.18±5.04	34.09±5.49	0.000	26.40±5.17	34.41±5.38	0.000
Extraversion	47.98±5.61	40.09±5.91	0.000	47.81±5.27	39.65±5.89	0.000
Openness	42.65±5.42	39.06±4.75	0.000	42.56±5.37	38.89±4.82	0.000
Agreeableness	45.05±5.43	39.69±5.60	0.000	44.90±5.51	39.50±5.52	0.000
Conscientiousness	50.80±5.61	42.46±5.68	0.000	50.60±5.65	42.05±5.66	0.000

*Unpaired two-tailed Student's t-test. Data are expressed as mean (SD).

Of course, there is another possibility that older divers, who are more experienced, are more cautious when operating in an underwater environment, which may be one of the reasons for the higher levels of anxiety measured.

Personality traits have been identified as risk/protective factors for anxiety.²⁵ The big five is one of the most relevant frameworks when examining the relationship between personality trait and anxiety and depression symptom.²⁶ Considerable research has investigated the relationship between neuroticism, extraversion and conscientiousness dimensions and anxiety. Longitudinal studies found that high trait neuroticism, low extroversion and low conscientiousness temporally precede anxiety disorders.²⁷ Consistently, our study found that individuals with higher trait anxiety and state anxiety scores scored significantly higher on the neuroticism dimension, significantly lower on the extraversion dimension and significantly lower on the conscientiousness dimension. In addition, the results of the correlation analyses showed that state anxiety and trait anxiety were both significantly positively correlated with neuroticism, and significantly negatively correlated with extraversion and conscientiousness, with the correlation coefficients all close to 0.7, indicating a moderately strong correlation. Besides, our study also supported the significant and relatively strong negative correlation between trait anxiety and state anxiety and openness and agreeableness. In addition, special operation divers with higher trait anxiety and state anxiety levels scored significantly lower in openness and agreeableness dimensions. The negative correlation between agreeableness and anxiety has been confirmed by many studies. Studies conducted during the COVID-19 found that agreeableness could protect patients against anxiety induced by the pandemic.²⁸ In addition, a cross-sectional study on Taiwan college students also found that the correlation between agreeableness and anxiety scores was significantly negative.²⁹

To our knowledge, no published data are available regarding anxiety levels and personality traits specifically among special operation divers. By gaining an understanding of anxiety profiles among special operation divers, as well as its influencing factors, relevant departments and managers may be able to identify individuals who are prone to anxiety and prevent them from participating in a high-demanding special underwater operation that could result in accidents or even casualties. The significant level of anxiety observed among divers suggests that the screening and selection process for this group is currently inadequate. Additionally, the percentage of individuals experiencing anxiety highlights the importance of providing support interventions for special operations divers. The association between personality traits and anxiety among special operations divers suggests that it is possible to predict an individual's anxiety levels based on their personality traits, which are relatively stable and easier to be measured.

This study is also subject to several inherent limitations. First, this cross-sectional study, using correlation analysis, failed to obtain a causal relationship between anxiety and demographic factors and personality traits.³⁰ Furthermore, the exclusive reliance on self-report questionnaires, while validated, may introduce self-reporting biases. Due to societal expectations, peer pressure or stigma, some participants might potentially under-report or overemphasise their psychological state. In addition, although the STAI is a well-established tool for measuring anxiety, its effectiveness in distinguishing between pathological and normal anxiety within the special operations community warrants further investigation.

CONCLUSIONS

First, the current study investigated the profile of anxiety and personality among special operation divers. Second, our study extended the research on the relationship between demographic and personality traits data with anxiety in special operation divers. We found that both prevalence of trait anxiety and state anxiety are relatively higher in special operation divers. The relationship between demographic data and anxiety suggests that attention must be paid attention to special operation divers who are 30 years or older or who have dived for more than 15 years. Correlations between personality traits and anxiety highlight that individuals with certain personality traits are unsuitable for special operation diving.

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Contributors HZ and YW conceived of the overarching study, served as the principal investigator, designed the study, implemented the study, performed the analysis of the data, wrote and revised the drafts of the manuscript and acts as guarantor. KL and JH collected and analysed the data. YF reviewed the study from its inception to the draft of the final manuscript and is the guarantor. All authors read and approved the final draft of the manuscript.

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Competing interests None declared.

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ORCID iD

Y Fang <http://orcid.org/0000-0003-2662-2214>

REFERENCES

- Kelly KR, Palombo LJ, Jensen AE, *et al.* Efficacy of closed cell wet-suit at various depths and gas mixtures for thermoprotection during military training dives. *Front Physiol* 2023;14:1165196.
- Gnanavel S, Robert RS. Diagnostic and statistical manual of mental disorders, fifth edition, and the impact of events scale-revised. *Chest* 2013;144:S0012-3692(15)48718-5.
- Cosci F, Fava GA, Sonino N. Mood and anxiety disorders as early manifestations of medical illness: a systematic review. *Psychother Psychosom* 2015;84:22–9.
- Tsai F-H, Wu W-L, Liang J-M, *et al.* Anxiety impact on scuba performance and underwater cognitive processing ability. *Diving Hyperb Med* 2020;50:130–4.
- Harris RJD, Doolette DJ, Wilkinson DC, *et al.* Measurement of fatigue following 18 msw dry chamber dives breathing air or enriched air nitrox. *Undersea Hyperb Med* 2003;30:285–91.
- Baddeley AD. Selective attention and performance in dangerous environments. *Br J Psychol* 1972;63:537–46.
- Helfrich ET, Saraiva CM, Chimiak JM, *et al.* A review of 149 Divers alert network emergency call records involving diving minors. *Div Hyperb Med* 2023;53:7–15.
- Griffiths TJ, Steel DH, Vaccaro P. Relationship between anxiety and performance in scuba diving. *Percept Mot Skills* 1979;48:1009–10.
- Hobbs M, Kneller W. Anxiety and psychomotor performance in divers on the surface and underwater at 40 m. *Aviat Space Environ Med* 2011;82:20–5.
- Morgan WP. Anxiety and panic in recreational scuba divers. *Sports Med* 1995;20:398–421.
- Morgan WP, Raglin JS, O'Connor PJ. Trait anxiety predicts panic behavior in beginning scuba students. *Int J Sports Med* 2004;25:314–22.
- Raglin JS, Stegner AJ. Psychobiological aspects of panic in SCBA AND SCUBA. *Int J Sport & Exerc Psychol* 2005;3:446–54.

- 13 Ong TF, Musa G. Examining the influences of experience, personality and attitude on SCUBA divers' underwater behaviour: A structural equation model. *Tour Manag* 2012;33:1521–34.
- 14 Driver BL, Knopf RC. Personality, outdoor recreation, and expected consequences. *Environ Behav* 1977;9:169–93.
- 15 John OP, Robins RW, Pervin LA. Handbook of Personality. *Theor Res* 1999.
- 16 Digman JM. Personality structure: emergence of the five-factor model. *Annu Rev Psychol* 1990;41:417–40.
- 17 Ka L, Elliott R, Ware K, et al. Associations between facets and aspects of big five personality and affective disorders: a systematic review and best evidence synthesis. *J Affect Disord* 2021;288:175–88.
- 18 Spielberger CD. *Manual for the state-trait anxiety inventory (self-evaluation questionnaire)*. Palo Alto: California Consulting Psychologists Press, 1970.
- 19 Ma M, Xiao C, Ou W. Psychometric property study of the affective lability scale-short form in Chinese patients with mood disorders. *Front Psychiatry* 2023;14:1160791.
- 20 Van Wijk CH, Martin JH, Firfirey N. Common mental health conditions among navy divers: A brief report. *Diving Hyperb Med* 2020;50:417–20.
- 21 St Leger Dowse M, Whalley B, Waterman MK, et al. Diving and mental health: the potential benefits and risks from a survey of recreational scuba divers. *Diving Hyperb Med* 2019;49:291–7.
- 22 Lindfors OH, Räisänen-Sokolowski AK, Suvilehto J, et al. Middle ear barotrauma in diving. *Diving Hyperb Med* 2021;51:44–52.
- 23 Kennedy-Little D, Sharman T. *Pulmonary barotrauma*. StatPearls Publishing, 2023.
- 24 Mallen JR, Roberts DS. SCUBA Medicine for otolaryngologists: Part I. Diving into SCUBA physiology and injury prevention. *Laryngoscope* 2020;130:52–8.
- 25 Tao Y, Liu X, Hou W, et al. The mediating role of emotion regulation strategies in the relationship between big five personality traits and anxiety and depression among Chinese firefighters. *Front Public Health* 2022;10:901686.
- 26 Yang T, Guo Z, Zhu X, et al. The interplay of personality traits, anxiety, and depression in Chinese college students: a network analysis. *Front Public Health* 2023;11:1204285.
- 27 Spinhoven P, Elzinga BM, Van Hemert AM, et al. Childhood maltreatment, maladaptive personality types and level and course of psychological distress: A six-year longitudinal study. *J Affect Disord* 2016;191:100–8.
- 28 Kumar VV, Tankha G. The relationship between personality traits and COVID-19 anxiety: A mediating model. *Behav Sci (Basel)* 2022;12:24.
- 29 Yang SW, Koo M. The big five personality traits as predictors of negative emotional states in University students in Taiwan. *Int J Environ Res Public Health* 2022;19:16468.
- 30 Bos FM, Snippe E, de Vos S, et al. Can we jump from cross-sectional to dynamic interpretations of networks? Implications for the network perspective in psychiatry. *Psychother Psychosom* 2017;86:175–7.