

Personality profiles of divers: integrating results across studies

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ABSTRACT

Background: There are numerous reports on diver personality, spanning across five decades, across national boundaries, and using a range of measures to describe diver profiles. However, the range of reports poses challenges to interpreting new studies, particularly when having to compare findings across generations, measurements, and national/cultural contexts. This paper aimed to review and integrate diver personality descriptions, drawing on the available studies that reported trait theory based data for naval and sport divers.

Materials and methods: Available studies on diver personality – associated with trait theory – were tabulated and the specific traits associated with divers described. Their findings were then integrated into a synthesised description of personality traits.

Results: The results suggest remarkably stable military diver profiles across generations, measures, and navies, with some unique differences observed due to national-cultural variables. It was of particular interest that different measures of personality appeared to present related constructions of diver profiles. Navy divers share, among others, a propensity for adventurousness, a strong sense of self-agency, and low trait anxiety. Unsurprisingly, personality profiling could not be generalised across military-civilian diving contexts, and the same clear profile differentiation of navy divers was not visible among sport divers.

Conclusions: Contemporary local data – in the context of military diving – could productively be compared to the body of existing reports, at least where similar theoretical models are used.

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Key words: personality measurement, profiling, navy divers, sport divers

INTRODUCTION

BACKGROUND

Personality – as human factor in extreme environments – remains of enduring interest. In the underwater context, personality studies have a rich history, and a survey of the available literature provides a number of psychological descriptions, in particular of navy divers, crossing generations, national borders, and certain operational contexts.

These studies can often be interpreted from a common theoretical viewpoint, as most of them are based on trait theory models. Trait theory views human nature from a perspective of consistent and enduring individual differences, and personality traits are defined as characteristic ways of behaving [1]. Using this framework, any individual could

be placed somewhere on the continuum of any given trait.

In spite of some theoretical common ground between studies on the personality of divers, both the temporal and geographic range of these reports pose, among others, three challenges to the interpretation and comparison of new studies. They are the challenges of generational, measurement, and cultural equivalence.

GENERATIONAL CHALLENGES

With studies spanning five decades (\pm 1970–2018), the extent to which findings can be generalised across time may be questioned (e.g. can findings from different decades be compared?). For example, historical contexts (war, conscription, nationalism, etc.) may all have influenced the recruitment of navy divers in the past, even as

socio-economic factors may do the same at present. In the recreational sphere, the popularisation of sport diving would potentially allow a wide range of personalities to participate, while the development of engineering technologies may have changed the demands on divers, potentially requiring a different personal profile to attain and maintain good psychological adaptation under water.

MEASUREMENT CHALLENGES

The measurement of personality poses two challenges to the comparison of results. This refers to the development of personality theory, and the development of measuring instruments (psychometry), over time. In this regard, earlier reports used older measures. Those studies used the prevailing theoretical models of the time. For example, Cattell's trait theory, which organised personality traits into 16 dimensions of human personality (known as the 16PF), was used extensively in the personality profiling of divers. This was supplemented by a consistent use of additional personality traits, such as Zuckerman's Sensation Seeking, or Rotter's Locus of Control, to further profile the personality of divers.

In contemporary psychology, the Five Factor Model (FFM) has emerged as the dominant framework for studying personality [2, 3]. The FFM is based on the observation that human personality traits can be reduced to five factors (sometimes referred to as the Big Five), and that all other traits fit within these five factors [4]. Recent studies have used the FFM to describe diver profiles, and as most of the instruments used to measure the Big Five were related (based on Costa and McCrae's 'International Personality Item Pool'; IPIP), their outcomes are generally comparable.

NATIONAL/CULTURAL CHALLENGES

Most of the older studies on diver personality emanated from the global north. World region has a significant effect on psychometric scale scores, for example on Big Five personality scales [5, 6], where smaller standard deviations are found in African samples (i.e. more homogenous expression of Big Five factors). Apart from region, culture further influences the development of personalities, with some culture-specific aspects corresponding to cultural syndromes such as complexity, tightness, individualism, and collectivism [7, 8]. Individualism is generally used to describe the predominant cultures of Western Europe, North America, Australia and New Zealand. In contrast, African, Middle Eastern and East Asian countries are characterised primarily by collectivism [8]. The reported differences in personality descriptions between so-called 'Western', and 'African', or 'Asian' samples open the possibility of different personality profiles between divers from different regions. Indeed, differences in country-specific navy diver samples have already been observed [9]. This leads to the challenge

of generalising findings across national boundaries (e.g. can findings from studies from different navies be compared?).

AIM

The range of studies describing diver personality traits, spanning across generations, countries, and measuring instruments, raised questions about the extent to which contemporary local data (whichever the locale) can be compared to the array of existing available reports (i.e. can results be generalised across studies?). This paper therefore aims to review and integrate diver personality descriptions, drawing on the available studies that reported trait theory based data for military and sport divers.

MATERIALS AND METHODS

DATA COLLECTION

The available studies on diver personality for which sufficient data could be obtained (including full reference, sample type, psychometric measures, and main findings) were included in this analysis. Only studies associated with trait theory, and available in English, were used. All the studies were in the public domain, and came from published academic papers or chapters from books, from technical reports, or from conference posters.

As mentioned, several studies reporting comprehensive profiling of diver personalities used derivatives of Cattell's 16PF model [10–17], and results can validly be compared using the 16PF trait-letters. Where studies used measures based on different models [18], easy synthesis across reports remains elusive [19].

Other studies exploring specific individual personality traits often used the same measures, allowing for direct comparisons across studies. Examples include Rotter's Internality-externality Scale [10, 16, 20] and Zuckerman's Sensation Seeking Scale [11, 20–22].

There are also a number of studies available that reported personality functioning of navy diver samples from a mental health perspective, using the Minnesota Multiphasic Personality Inventory (MMPI) [23–28]. They all appear to report similar findings, namely a generally positive mental health profile among divers across various navies, with specific and consistent outliers across the studies [27]. MMPI studies were excluded from the current analysis.

Fewer studies used the FFM, are all more recent, and are mostly in the sport diver domain [29–31]. While they employed an array of instruments, all were based on the IPIP, and their outcomes thus comparable.

DATA ANALYSIS

The personality studies were tabulated and the specific traits associated with divers described (Table 1). This was

Table 1. Selected reports on diver personality profiling

Serial	Authors, year	Sample	Traits/factors	Psychometric measures	Summary of main findings
1	Biersner and Cameron, 1970 [23]	Navy	Comprehensive personality scale	EPPS	Higher masculinity Lesser socialisation Greater aggressiveness Greater risk taking
2	Biersner, 1973 [32]	Navy	Risk taking Behavioural history	Betting game History	More traffic violations and more arrests
3	Biersner and Larocco, 1983 [10] Biersner and Larocco, 1987 [11]	Navy	Specific traits: – locus of control – socialisation scale – trait anxiety – sensation seeking	RIES CPI STAI SSS	Greater internality Lesser socialisation Lower trait anxiety Seek physical adventure/risks, rather than simply novel experiences
4	Beckman et al., 1996 [18]	Navy	Comprehensive personality scale	MIPS	Optimistic Independent Self-serving Analytical Tend towards social aggressiveness
5	Van Wijk and Waters, 2001 [17]	Navy	Comprehensive personality scale	16PF	Enthusiasm: F ⁺ Adventurousness: H ⁺ Confidence: O ⁻ Group orientation: Q2 ⁻
6	Van Wijk, 2007, 2008, 2014 [16, 22, 33]	Navy	Specific traits: – sensation seeking – locus of control – trait anxiety Comprehensive personality scale	SSS-V RIES STPI 16PF	High TAS, low DI and BS Greater internality Lower trait anxiety Enthusiasm: F ⁺ Adventurousness: H ⁺ Confidence: O ⁻ Low anxiety: Q4 ⁻
7	Colodro-Plaza et al., 2014, 2015 [13, 14]	Navy	Comprehensive personality scale Anxiety	16PF FIA	Emotional stability: C ⁺ Self-control: Q3 ⁺ Low: – sensitivity: I ⁻ – apprehension: O ⁻ – tension: Q4 ⁻
8	Shopov and Vazharov, 2017 [15]	Navy	Comprehensive personality scale	16PF	Enthusiasm: F ⁺ Adventurousness: H ⁺ Confidence: O ⁻ Group orientation: Q2 ⁻
9	Van Wijk, 2018 [34]	Navy	“Big Five”	BFI-44	Agreeableness: A ⁺ Conscientiousness: C ⁺ Neuroticism: N ⁻
10	Martin and Myrick, 1976 [35]	Sport divers	Comprehensive personality scale	VPQ	Socially aggressive Low anxiety
11	Griffiths et al., 1978 [36]	Sport divers	Specific trait: – trait anxiety	STAI	Lower trait anxiety
12	Heyman and Rose, 1980 [20]	Sport divers	Specific traits: – locus of control – trait anxiety – sensation seeking – masculinity	RIES STAI (T-Ax) SSS-V BSRI	Both men and women: Greater internality Lower trait anxiety More sensation seeking Higher masculinity

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Table 1 (cont.). Selected reports on diver personality profiling

Serial	Authors, year	Sample	Traits/factors	Psychometric measures	Summary of main findings
13	Taylor et al., 2001 [21]	Sport divers	Specific trait: – sensation seeking	SSS-V	High TAS and ES, low DI (with total similar to reference group)
14	Van Wijk, 2002 [37]	Sport divers	Comprehensive personality scale	16PF	Enthusiasm: F ⁺ Adventurousness: H ⁺ Confidence: O ⁻ Other factors were undifferentiated
15	Coetzee, 2010 [12]	Sport divers	Comprehensive personality scale	CAQ	Boldness: H ⁺ Self-sufficiency: Q2 ⁺ Suspiciousness: L ⁺ Tension: Q4 ⁺ Low: – warmth: A ⁻ – emotional stability: C ⁻ – conformity: G ⁻ – sensitivity: I ⁻
16	Musa et al., 2010 [29]	Tourist divers	Big Five	NEO-FFI	Agreeableness: A ⁺ Conscientiousness: C ⁺
17	Ong and Musa, 2012 [30]	Tourist divers	Big Five	NEO-PI-R	Extraversion (NS): E ⁺ Agreeableness (NS): A ⁺ Openness to experience: O–E ⁺
18	Shopov and Vazharov, 2017 [15]	Sport divers	Comprehensive personality scale	16PF	Dominance: E ⁺ Other factors were undifferentiated
19	Van Wijk, 2018 [31]	Tourist divers	Big Five	BFI-44	Agreeableness (NS): A ⁺ Conscientious (NS): C ⁺

Serial 10, 11, 12, 14 were university students; EPPS – Edwards Personal Preference Schedule; RIES – Rotter's Internality-Externality Scale; CPI – California Personality Inventory; STAI – State-Trait Anxiety Inventory; SSS – Sensation Seeking Scale; MIPS – Millon Index of Personality Styles; 16PF – 16 Personality Factor Questionnaire; STPI – State-Trait Personality Inventory; FIA – Facilitating and Inhibiting Anxiety questionnaire; VPQ – Veldman Parker Questionnaire; BSRI – Bem Sex Role Inventory; CAQ – Clinical Analysis Questionnaire; NEO-FFI – NEO Five-Factor Inventory; NEO-PI-R – NEO Personality Inventory-Revised; BFI-44 – Big Five Inventory-44; NS – not significant; TAS – Thrill and Adventure Seeking; DI – Disinhibitions; BS – Boredom Susceptibility; ES – Experience Seeking

done separately for military and for sport divers. As could be expected, fewer studies were available for sport divers, possibly because the number of certified sport divers is larger and their personality profile therefore less homogenous. The table was used to develop an integrated personality description of divers.

RESULTS

Drawing on the studies collected in Table 1 (the references below are Table 1 serial numbers), there appear to be general consensus that military divers share the following traits:

- A propensity for sensation seeking, adventurousness, and associated risk-taking (serial 1, 2, 3, 5, 6, 8);
- A strong sense of self-agency (also referred to as internality, dispositional confidence) (serial 3, 4, 5, 6, 7, 8);
- Low trait anxiety (serial 3, 6, 7); and
- Enthusiasm and optimism (serial 4, 5, 6, 8).

These shared traits appear to hold stable across time (\pm 1970–2015) and across different navies, e.g. United States Navy (USN), South African Navy (SAN), Spanish Navy, and Bulgarian Navy.

Further, most USN studies suggest lesser socialisation (serial 1, 3, 4), although this was not found among Spanish or Bulgarian Navy divers (serial 7, 8), and even contrasted by particularly good social cooperation expressed among SAN divers (serial 5). Other differences in the reports of military divers appear to stem from methodological differences rather than referring to personality differences across samples.

The only study using FFM data with military divers reported higher scores for agreeableness and conscientiousness, and lower scores for neuroticism (serial 9). The highly differentiated and homogenised profile was particularly noteworthy.

For sport divers, there appear to be general consensus regarding:

- A propensity for sensation seeking, adventurousness, and associated risk-taking (serial 12, 13, 14, 15); and
- Somewhat lesser socialisation (serial 10, 15).

There are further some indications of lower trait anxiety (serial 10, 11, 12), but this is not universally supported (serial 15), and there are also alternative views suggesting population normative trait anxiety among non-professional divers [38, 39]. Other differences in personality descriptions may

indicate limitations to comparisons across civilian sport diver samples, rather than actual personality differences. It is noteworthy that a number of studies using comprehensive scales reported relatively undifferentiated profiles (serial 14, 18).

Recent studies using FFM data with sport divers suggest limited consistency in profile differentiation across the factors (serial 16, 17, 19), providing support for the idea that there generally is little differentiation in their profiles. The most consistent finding is that of possibly somewhat higher Agreeableness (serial 16, 17, 19), and given that sport diving is often a group activity, is therefore not surprising.

There were only two studies that directly compared navy and sport divers [15, 37], and both found a range of significant differences on their 16PF group profiles.

DISCUSSION

The personality profiles of military divers – using trait theory – appear surprisingly consistent across both generational and cultural contexts, as well as across different (but theoretically related) measures. While there is little evidence of personality's predictive value for selection purposes [40], the consistent profile is noteworthy in that it may reflect a response to environmental demands, and could thus be seen as supportive of personality-as-coping theories [41].

Using the Big Five, the SAN profile was clearly differentiated and highly homogenised (and far more homogeneous than the sport diver samples using similar measures [29–31]). Unfortunately, the data is not able to answer the question of whether this homogenisation was reflective of a) navy diver selection influences, or b) any specific personality profile associated with this specialised environment, or c) local culture, in that previous studies found African samples to express homogenised scores on FFM measures [6], or d) other socialisation or adaptation dynamics.

It is noteworthy that low trait anxiety (also referred to as generalised anxiety or neuroticism) is consistently reported in navy diver samples, which leads to the question whether this reflects environmental requirements, or whether it is a function of selection (often required for military diving training), as the same findings are present in some sport diver samples, but not in others. There is a further interesting apparent contrast between the SAN and South African sport diver samples on anxiety (serial 6, 9 vs. 15), although this may simply reflect sample composition (e.g. experienced navy divers vs. entry level sport divers).

There was no strong profile differentiation for sport divers, and efforts to profile sport divers are probably unproductive given the range of individuals who enter diving as a sport. While low trait anxiety was consistently emphasised in almost all the military diver studies, the construct appears

to be of lesser importance in the sport diving environment. However, given the reported association of elevated trait anxiety with panic proneness [42], this observation from recreational diving requires further consideration.

One exception to an otherwise consistent profile across navy samples is the divergent reports on constructs of social or group orientation (also referred to as socialisation or agreeableness). USN samples suggest lesser social cooperation, whereas SAN samples report good social integration, with European samples in between. The SAN profile is not unexpected, as social components in the SAN diving context have been described previously [43]. The divergent profiles may partly be due to individual navy settings (e.g. practical contexts). For example, SAN divers not only train and work in small teams with great emphasis on social cooperation; but as the diving branch is small, they also work with the same group for their whole career. Their profile may thus be the result of the socialisation into that specific operational environment. Further to the practical context, the divergent profiles may also reflect cultural presentations. As reviewed earlier, Individualism is generally associated with the dominant cultures of North America, while African cultures are often characterised primarily by Collectivism [8]. The consistency of the reports across time suggests that this is probably not a generational issue, but rather a cultural one.

There are a number of limitations to this analysis. The geographical range of the studies were limited, and reports from elsewhere in the world, also in different languages, may need to be consulted to gain a full understanding of the consistency of reported profiles. Further, diving contexts, particularly for the military samples, were not incorporated. In this regard the type of diving (e.g. combat diving, deep sea clearance diving, rescue and recovery diving, etc.) may influence the desirability of any particular personality trait or profile.

Personality descriptions, while academically interesting, may have limited practical application. Future research needs to extend personality studies from being descriptive, to associating profiles with behavioural markers, for example safety behaviour, injury risk, and psychological adaptation, to optimise the practical value of personality assessment.

CONCLUSIONS

Military diver profiling appears remarkably stable across generations, measures, and navies, with some unique differences due to national/cultural variables. It was of particular interest that different measures of personality appeared to present related constructions of diver profiles. Unsurprisingly, personality profiling could not be generalised across military-civilian diving contexts, and the same clear profile differentiation of navy divers was not visible among sport

divers. In conclusion, the analysis suggests that contemporary local data – in the context of navy diving – could productively be compared to the body of existing reports, at least where similar theoretical models are used.

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