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SELF-ACTUALISATION, MEANING IN LIFE AND PSYCHOLOGICAL DISTRESS IN RELATION TO PERSONALITY TRAITS OF SCIENTISTS

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Abstract *This study was conducted to investigate the levels of self-actualisation, meaning in life and psychological distress of agricultural scientists in relation to their personality traits. Data was collected from 443 respondents (306 males, 137 females; mean age 37.2 ± 7.2 years) by administering the Big-Five Inventory, Short Index of Self-Actualization, Meaning in Life Questionnaire and Depression, Anxiety and Stress Scale. Findings revealed significant gender differences in extraversion and neuroticism among personality traits and meaning in life, favouring males whereas, females recorded higher scores in self-actualisation. Such gender differences were not observed in the scores on psychological distress. With increased experience, i.e., length of the service, extraversion, conscientiousness and neuroticism among personality traits, the presence of meaning and psychological distress was increased. The chronological age of scientists was positively correlated with extraversion, conscientiousness and presence of meaning and; negatively correlated with anxiety and depression especially in male participants. Among personality traits, agreeableness and openness were positively correlated with self-actualisation. Psychological distress was negatively associated with all the personality traits except neuroticism. The implications of these findings in relation to well-being and the workplace environment of the scientists are discussed.*

Keywords: *Self-Actualisation, Meaning in Life, Psychological Distress, Personality Traits, Agricultural Scientists*

INTRODUCTION

Self-actualisation is "the psychological process that aims at maximizing the use of a person's abilities and resources. This process may vary from one person to another" (Maslow, 1943). It is essential to mention that this psychological aspect differs according to varying degrees of the individuals' self-fulfilment and motivation. It is considered one of the critical needs as it is situated at the top of Maslow's hierarchy of needs. Jena and Dorji (2016) demonstrate that self-actualisation can be attained if the motivational factors like attention, resources and security, etc. are provided. The basic needs of the human must be fulfilled to achieve self-actualisation. By accomplishing self-actualisation, we can find the meaning and purpose in life (Kaufman, 2018).

Humans are characterised by a "will to meaning", an innate drive to find meaning and significance in their lives, and that failure to achieve meaning results in "psychological distress" (Frankl, 1963). Psychological distress is a state of emotional suffering associated with stressors and demands that are difficult to cope with in daily life. The lack of effective care for and difficulty in identifying psychological distress are very important components of well-being (Ryff & Singer, 1998). Stress responses are normal reactions to environmental or internal perturbations and can be considered adaptive in nature. Distress occurs when stress is severe, prolonged, or both. Psychological Distress (PD) is a common mental health problem in the community. PD is a state of emotional suffering typically characterised by symptoms of depression and anxiety (WHO, 2022).

Personality research has demonstrated how certain traits make scientific talent and achievement more likely, such as openness to experience, drive and ambition, competitiveness and confidence. These findings and their unanswered questions lay the foundation for an informed model of the psychology of scientific talent (Feist, 2014). Psychological well-being represents an important component of mental

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health and has been proposed as being the final goal of humans (Ryff, 1989; Disabato et al., 2016). The research profession is one of the effective occupations in eliciting feelings of happiness and contentment. Consistent with this idea, several anecdotal reports indicated that scientists accumulate higher happiness and satisfaction in their life (Wolpert & Richards, 1997). Empirical research has additionally proven that scientists are less likely to be afflicted with mental disorders compared with non-scientists (Ludwig, 1995; Rawlings & Locarnini, 2008). However, no study to this point has measured scientists' psychological well-being in terms of their self-actualisation and finding a meaning in life. Psychological well-being typically improves overall cognitive performance (Lyubomirsky et al., 2005) and it is also positively associated with performance in scientists (Sato, 2016).

LITERATURE REVIEW

Maslow's theory of human motivation has implications for the modern investigation of well-being. Maslow (1998) found a strong relationship between self-actualisation and psychological health. One of the most prominent frameworks in the study of well-being is an investigation of life satisfaction (Diener et al., 1985; Pavot & Diener, 2008). This framework looks at the subjective evaluation of one's overall satisfaction with life. Ryff's (1989) model of psychological well-being is even more relevant to Maslow's conceptualisation of self-actualisation. In general, the self-actualised person is in the process of maximising his or her full potential. Jones and Crandall (1986) developed a scale to measure self-actualisation based directly on Maslow's writings. The characteristics of self-actualisation were also associated with greater well-being across a number of indicators of well-being, including greater life satisfaction, self-acceptance, positive relations, environmental mastery, personal growth, autonomy, purpose in life, and self-transcendent experiences. Self-actualisation scores were significantly correlated with all the Big Five personality traits and also predicted work-related outcomes and creativity across multiple domains of achievement (Kaufman, 2018).

Another aspect of Maslow's (1950) theory that still holds promise is his proposed list of the characteristics of self-actualising people. From its inception, the field of humanistic psychology has been deeply rooted in the field of personality psychology. Indeed, one of the founders of personality psychology, Gordon Allport, introduced the phrase "humanistic psychology" to the study of personality during the 1930s, and he contributed to the concept of the "whole person" and the importance of personality integration. As McAdams and Pals (2006) note, the founders of personality psychology (Allport, 1937; Murray, 1938) had as their mission to provide "an integrative framework for understanding the whole person". Recently, personality psychologists have returned to the origins of the field, furthering our understanding of the whole person (McAdams & Pals, 2006; Molenaar & Campbell, 2009; Sheldon, Cheng, & Hilpert, 2011). The most prominent personality traits investigated in contemporary personality psychology are the "Big Five"—Extraversion, Neuroticism, Agreeableness, Conscientiousness and Openness to Experience—which have been shown to account for most of the covariance among more specific personality traits (McCrae & Costa, 2008).

In recent years, the construct of meaning in life has received considerable attention and legitimacy, perhaps in conjunction with a growing focus on positive traits and psychological strengths (Ryan & Deci, 2001; Seligman & Csikszentmihaly, 2000). Invariably, meaning in life is regarded as a positive variable, an indicator of well-being (Ryff, 1989) and a facilitator of adopting coping mechanisms (Park & Folkman, 1997). Research has supported the link between lack of meaning and psychological distress. Having less meaning in life has been associated with a greater need for therapy (Battista & Almond, 1973), depression and anxiety (Debats et al., 1993) and suicidal ideation and substance abuse (Harlow et al., 1986), as well as other forms of distress. Having more meaning has been positively related to work enjoyment (Bonebright et al., 2000), life satisfaction (Chamberlain & Zika, 1988) and happiness (Debats et al., 1993), among other measures of healthy psychological functioning.

The definition of meaning in life varies throughout the field, ranging from coherence in one's life (Battista & Almond, 1973) to goal directedness or purposefulness (e.g., Ryff & Singer, 1998) to "the ontological significance of life from the point of view of the experiencing individual" (Crumbaugh & Maholick, 1964). Others offer semantic definitions (e.g., "What does my life mean?" (Baumeister, 1991). Likewise, there is diversity in perspectives regarding how to achieve meaning in life. Because there is no universal meaning that can fit everyone's life (Frankl, 1965), each person must create meaning in his or her own life (Battista & Almond, 1973), whether through the pursuit of important goals (Klinger, 1977) or the development of a coherent life narrative (Kenyon, 2000). Baumeister (1991) proposed that a feeling of meaning can be attained by first meeting needs for value, purpose, efficacy and self-worth. Others have indicated the importance of everyday decision making and action (Maddi, 1970) or self-transcendence (e.g., Allport, 1961; Seligman, 2002) in the creation of meaning.

Stress is a widespread phenomenon experienced by employees today. Motowidlo et al. (1986) define stress as "an unpleasant emotional experience associated with elements of fear, dread, anxiety, irritation, annoyance, anger, sadness, grief, and depression". When the environment presents a demand exceeding the capabilities

of the individual, potential stress arises (McGrath, 1976). Stress is also analysed as a condition at work causing physiological or psychological disruptions (Margolis et al., 1974). Another way of explicating job stress is through the person-environment fit model, which details two types of relationship as follows (French et al., 1974): the extent to which the individual's capabilities and skills match his/her job requirements is one fit; and the degree to which the employee's needs are fulfilled/supplied by the job environment is another fit. Job stress occurs when there is a case of misfit in either of these relationships. World Health Organization defines occupational or job stress as "the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities, and which challenge their ability to cope". This definition indicates that stress arises when there is a mismatch between the capabilities of a person and what is ultimately demanded of him/her. As identified from the popular theories of workplace stress, job stress originates from job overload and pressure, low levels of autonomy at the job and low levels of social support (Karasek & Theorell, 1990). Low levels of reward in terms of recognition, pay and promotion despite high commitment levels also act as potential stressors (Siegrist, 1996).

About one-third of workers report high levels of stress. This can create a burden for employers in health care costs, periods of disability, absenteeism, job turnover and poor productivity (Hassard et al., 2018). More than three-quarters of American adults report symptoms of stress, including headache, tiredness, or sleeping problems (APA, 2019). As per WHO (2022), the COVID-19 pandemic triggers a 25% increase in the prevalence of anxiety and depression worldwide. One major explanation for the increase is the unprecedented stress caused by the social isolation resulting from the pandemic. Linked to this were constraints on people's ability to work, seek support from loved ones and engage in their communities. In a global study during the COVID-19 pandemic involving 113,285 individuals across countries, it was reported that the prevalence of all forms of depression was 20%, anxiety at 35% and stress at 53% (Lakhan et al., 2020). According to a global analysis, the prevalence of stress, anxiety and depression, as a result of the pandemic in the general population is 29.6, 31.9 and 33.7%, respectively (Salari et al., 2020). Similarly, in India, the prevalence of depression, anxiety and stress during the pandemic was reported to be 25, 28 and 11.6%, respectively (Verma & Mishra, 2020). In a study to assess the levels of perceived stress among the scientific personnel (n = 238) in the National Agricultural Research and Education System (NARES) in India, about 65% were reported to have moderate stress, and 15% had severe stress (Ramesh, 2017). In a recent study on personality and well-being traits of agricultural scientists (n = 622), it is reported that 25.7% of them were vulnerable to stress and anxiety as they possess a personality trait known as "Neuroticism" which reflects emotional stability (Ramesh et al., 2021).

Present Study

The NARES in India primarily comprises a network of 101 Research Institutions working directly under the Indian Council of Agricultural Research (ICAR) and 71 Agricultural Universities, which is one of the biggest national agricultural research systems in the world. There are about 40,000 professionally trained scientific personnel employed in the NARES to look after research, education and extension activities. These scientific personnel specialised in about 90 different disciplines of agricultural sciences covering field crops, horticulture, animal sciences, fisheries, engineering and social sciences (ICAR, 2023).

Based on our review, we found out that the research on the scientists' personality traits in relation to their well-being attributes and psychological distress is meagre, especially in the domain of agricultural sciences. Hence, the present investigation was conducted to assess the personality traits of scientists and their levels of self-actualisation, meaning in life, degree of psychological distress and their interrelationship.

Hypotheses

Self-actualisation and a sense of purpose in life have been linked to positive psychological functioning and well-being. They have also been shown to predict work-related outcomes and creativity in a variety of achievement domains. Both negative psychological functioning or psychological discomfort as well as positive psychological functioning and well-being are predicted by personality traits. Providing opportunities to realise employees' innate potential through self-actualisation, finding meaning in life or vocation and minimising their psychological distress, not only improves their productivity but also enhances their overall quality of life.

METHODOLOGY

Sample

The present study was conducted on the research scientists working in the NARES in India. The participants include scientists working in various research institutes under the ICAR and in State Agricultural Universities (SAUs). Most respondents in the study are participants in different training programs organised by the National Academy of Agricultural Research Management (NAARM), Hyderabad, India, a training academy under ICAR during the period 2022–23, using a simple random sampling technique Besides, data was also collected from the scientists from both ICAR and

SAUs through an online survey using Google Forms during the same period. A total of 443 participants (137 females, 30.9%) responded to the study. The participants' age varied from 24 to 63 years with an average of 37.2 years and a standard deviation of 7.23 Their educational levels varied from post-graduation to Ph.D. in their respective disciplines in agricultural and allied subjects. The participants have professional experience ranging from 1 to 34 years with an average of 12.8 years and a standard deviation of 8.25.

Measurement Tools

Big-Five Inventory-10 (BFI-10)

The BFI is a scale that measures a person on the major five domains of personality viz., extraversion, agreeableness, conscientiousness, neuroticism and openness (John & Srivastava, 1999). The BFI-10 comprised 10 items taken from the BFI-44, two items for each personality trait viz., items 6 & 36 for extraversion, 2 & 22 for agreeableness, 3 & 23 for conscientiousness, 9 & 39 for neuroticism and 20 & 41 for openness. Each item is estimated with the same Likert scale as for the BFI-44, giving a number of 2–10 for every domain total score (Rammstedt & John, 2007). It is a short-scale version of the well-established BFI and was developed to produce a questionnaire for research settings with extreme time constraints. Previous analysis has clearly shown that the BFI-10 possesses psychological properties that are comparable in size and structure to those of the larger version of BFI; the alpha Cronbach coefficient values varied between 0.45 and 0.62 (Balgiu, 2018; Gosling et al., 2003).

Short Index of Self-Actualization (SISA)

One widely accepted scale for measuring self-actualisation is the short 15-item SISA index (Jones and Crandall, 1986). The SISA was developed from the longer personal orientation inventory (POI) index (Shostrom, 1964) and designed to provide a shorter, simple scale correlated highly to the POI. SISA was chosen for this research because it is both highly correlated with POI and has been repeatedly validated (Richard & Jex, 1991). The SISA scale includes 15 statements that relate to an individual's beliefs, attitudes, feelings and emotions. Agreement with items 1, 3, 4, 7, 10, 12 and 15 is considered manifest self-actualisation. Similarly, disagreement with the remaining items (2, 5, 6, 8, 9, 11, 13 and 14) is considered to manifest self-actualisation. A self-actualisation response from the four options equates to four points, decreasing to one point for the non-self-actualisation response. For example, four points would be scored if the subject marked "agree" for item 1 and one point would be scored if "disagree" was marked. The maximum possible score for the SISA inventory is 60.

Meaning in Life Questionnaire (MLQ)

A 10-item questionnaire designed to measure two dimensions of meaning in life: (1) Presence of meaning (how much respondents feel their lives have meaning), and (2) Search for Meaning (how much respondents strive to find meaning and understanding in their lives). Respondents answer each item on a 7-point Likert-type scale ranging from 1 (Absolutely Untrue) to 7 (Absolutely True). The scores in each dimension varied from 5 to 35 (Steger et al., 2006). The MLQ has good internal consistency, with coefficient alphas ranging in the low to high 0.80 for the presence subscale and mid-0.80 to low 0.90 for the search subscale (Strack, 2007).

Depression, Anxiety and Stress Scale (DASS 21)

It is a self-rated questionnaire which assesses the severity of the symptoms of depression, anxiety and stress. It contains statements referring to the past week. Each item is rated on a 4-point scale (did not apply to me at all means a score of 0, Applied to me very much or most of the time means a score of 3). Subjects are asked to circle a 0–3 number indicating how much each statement applied to him/her in the last week. Scores for depression, anxiety and stress are calculated by adding the scores for the relevant items. Each subscale is divided into normal, mild, moderate, severe and extremely severe (Lovibond & Lovibond, 1995).

Procedure

A Google Form questionnaire was administered to the participants of the survey by highlighting the purpose and objectives of the survey, the confidentiality of data and the instructions to be followed by the participants while responding to the items in the survey. The data collected includes the socio-demographic details of the participants followed by the statements in each of the test tools used in the survey. The survey questionnaire was administered to the participants online. Tests were scored, tabulated and descriptive statistics were calculated. The Cronbach's reliability coefficients were used to measure the internal consistency of the test items (Cronbach, 1951). The student's t-test was employed for gender-wise comparisons. Pearson correlation analysis was carried out to check and quantify the association between different study variables. All the analysis was carried out using R Version 4.1.0.

RESULTS

The mean scores of scientists on Big-Five personality traits, self-actualisation, meaning in life and psychological distress, along with their standard deviation, t-values and Cronbach alpha coefficients, are presented in Table 1. Among the scientists, males scored significantly higher in extraversion

(5.63 ± 1.53) and neuroticism (5.71 ± 1.59) compared to females (5.28 ± 1.52 in extraversion; and 5.28 ± 1.74 in neuroticism). Such gender differences are not conspicuous in other personality traits like agreeableness, conscientiousness and openness. The Cronbach alpha coefficients obtained varied from 0.27 for agreeableness to 0.39 for extraversion. We have calculated the number of participants who scored more than the average in each trait on BFI-10 and the present population is depicted in Fig. 1(a). Among the respondents, males have a higher percentage of extraversion (56.5%), conscientiousness (57.5%), neuroticism (58.8%) and openness (58.4%) compared to female scientists. However, in the agreeableness trait, females recorded a higher percentage (74.4%) compared to male scientists (66.6%).

The scores on self-actualisation were found higher in females (37.77 ± 5.22)) compared to male scientists (36.77 ± 5.04). The internal consistency of the self-actualisation test measured through the Cronbach alpha coefficient, was 0.42 (Table 1). The participants who got more than the above-average scores (≥ 40) in self-actualisation were calculated and depicted in Fig. 1(b). Females recorded a higher percentage (32.8%) compared to male scientists (28.7).

The meaning in life measured in terms of both search for meaning and total scores were significantly higher in males compared to female scientists. However, such gender differences were not seen in the scores on the presence of meaning (Table 1). The Cronbach alpha coefficient values varied from 0.75 to 0.84 for measuring different dimensions of the meaning in life. A higher percentage of males recorded above-average scores in both presence (60.1%) and search (64.7%) compared to female scientists (Fig. 1c).

In psychological distress, even though, males recorded slightly higher total scores (16.33 ± 10.42) than the female scientists (15.86 ± 8.86), they were not statistically significant. Similar non-gender differences were also observed in terms of stress, anxiety and depression (Table 1). The participants who got above-average scores in different dimensions of psychological distress were calculated and depicted in Fig. 1 (d). Females recorded a higher percentage of anxiety (43.7%) and depression (25.8%) compared to male scientists (41.1% anxiety and 23.8% depression). However, such gender differences were not found in the stress parameter, where both sexes recorded a similar percentage (18.9%).

The mean scores of scientists as influenced by their length of service are presented in Table 2**.** Personality traits viz., extraversion, conscientiousness and neuroticism scores were found to increase with their length of service. Whereas, openness scores decreased with the increased years of service. However, such a trend is not found in agreeableness traits over the years of service. Self-actualisation scores were higher (37.54 ± 5.42) for scientists who put forth less than 10 years of service, followed by a slight decline (36.75 ± 5.09) between 10 and 20 years of service and, 36.29 for scientists with more than 20 years of service. Presence of meaning in life scores were increased with increased length of service. However such an increased trend was not observed with the search for meaning in life. However, total scores of meaning in life increased from 48.62 (less than 10 years of service) to 49.49 (between 10 and 20 years of service) and 50.08 (above 20 years of service). Psychological distress in terms of stress, anxiety and depression scores were the lowest for the scientists with less than 10 years of service (total score 16.80 ± 10.14) and slightly increased to 18.57 ± 9.74 for those 10–20 years of service and 18.71 ± 9.74 for those with more than 20 years of service.

Inter-correlations were calculated between the chronological age of participants with their personality traits and other attributes and Pearson's coefficient of correlations, which are presented in Table 3. Among the personality traits, extraversion and conscientiousness were significantly positively correlated with age. Even though non-significant, agreeableness and neuroticism were positively correlated and openness was negatively correlated with age. However, these associations were stronger in the case of males than female participants. The presence of meaning was positively correlated whereas, the search for meaning was negatively correlated with the participant's age. However, the total scores for meaning in life were found to be positively correlated with age. In general, psychological distress viz., stress, anxiety and depression were negatively correlated with age, however, this relationship was significant only in the case of males for anxiety and depression.

The inter-correlations between personality traits and other attributes were worked out and their coefficient of correlations is presented in Table 4. All personality traits except neuroticism were positively associated with the self-actualisation scores; even though only agreeableness and openness were found significantly correlated. Similarly, all the personality traits except neuroticism were positively associated with the presence of meaning, search for meaning and their total scores, even though they were not statistically significant. Except for neuroticism, all the personality traits were negatively correlated with stress, anxiety and depression parameters in psychological distress, However, their inter-dependence was statistically significant in the case of agreeableness, conscientiousness and openness (only with depression).

DISCUSSION

The Big Five personality traits, sometimes known as "the Five-Factor model of Personality", is a grouping of five unique characteristics used to study personality. In the present study, males recorded higher extraversion, conscientiousness, neuroticism and openness whereas, females recorded higher agreeableness (Table 1 & Fig. 1a). Most of the personality traits were found to increase

with the increased length of the service except for openness (Table 2). Earlier studies confirmed that males in general, are stronger in extraversion, conscientiousness and openness traits (Akyunus et al., 2021; Donnellan & Lucas, 2008); and females are found to be higher in neuroticism (Soto et al., 2011) and agreeableness (Kaiser et al., 2019). Lounsbury et al. (2012) reported significantly higher levels of openness and lower levels of conscientiousness, emotional stability and extraversion among the scientist, compared to non-scientists. In a study from India, scientists were found to have higher levels of extraversion and conscientiousness, and better levels of openness, compared to non-scientists (Ramesh, 2020).

Self-actualisation, in Maslow's hierarchy of needs, is the highest level of psychological development, where personal potential is fully realised after basic bodily and ego needs have been fulfilled. In the present study, self-actualisation was measured through the short 15-item SISA (Jones & Crandall, 1986) and it was found that females recorded higher self-actualisation scores compared to male scientists (Table 1 & Fig. 1b), and the scores were slightly decreased with the increased length of the service (Table 2). Self-actualisation manifests characteristics like spontaneity, autonomy, comfort with solitude, a non-hostile sense of humour, fellowship with humanity and the ability to have peak experiences (D'Souza et al., 2015).

Table 1: Mean Scores of Scientists on Different Attributes as Influenced by Gender

Attributes	Males (n = 306)	Females (n = 137)	T-Value	P-Value	α-Coefficient
Big-Five Personality Traits (Score Range: 2-10**)**					
Extraversion	5.63 ± 1.53	5.28 ± 1.52	-2.219*	0.027	0.39
Agreeableness	8.21 ± 1.60	8.47 ± 1.34	1.765	0.078	0.27
Conscientiousness	7.89 ± 1.71	7.83 ± 1.58	-0.397	0.691	0.31
Neuroticism	5.71 ± 1.59	5.28 ± 1.74	-2.471*	0.014	0.38
Openness	4.67 ± 1.65	4.48 ± 1.64	-1.066	0.287	0.32
Self-Actualization (Score Range: 15-60**)**	36.77 ± 5.04	37.77 ± 5.22	2.034*	0.048	0.42
Meaning in Life (Score Range: 5-35**)**					
Presence of Meaning	24.85 ± 3.31	24.43 ± 3.89	-1.111	0.268	0.84
Search for Meaning	25.14 ± 6.57	23.022 ± 8.02	-2.710*	0.007	0.84
Total score	49.99 ± 7.78	47.45 ± 8.80	-2.909*	0.003	0.75
Psychological Distress (Score Range: 0 -21**)**					
Stress	6.60 ± 3.69	6.42 ± 3.35	-0.517	0.605	0.76
Anxiety	5.31 ± 4.08	5.12 ± 3.32	-0.525	0.600	0.77
Depression	4.40 ± 3.54	4.31 ± 3.23	-0.266	0.790	0.77
Total Score	16.33 ± 10.42	15.86 ± 8.86	-0.486	0.627	0.90

*P < 0.05

A 10-item questionnaire designed to measure two dimensions of meaning in life: (1) Presence of meaning (how much respondents feel their lives have meaning) and (2) Search for meaning (how much respondents strive to find meaning and understanding in their lives). In the present study, gender differences were not found with regard to the presence of meaning whereas, the scores on the search for meaning and the total scores were found higher in males compared to female scientists (Table 1) and the percentage of people with above-average scores in both presence and search were higher in males than the females (Fig. 1c). The total scores in meaning in life were improved with the increased length of their service (Table 2). Meaning in life has been identified as a potential mediator of the link between religiousness and psychological health (Steger & Frazier, 2005).

Table 2: Mean Scores of Scientists on Different Attributes as Influenced by Their Length of Service

Attributes	Less than 10 Years of Service (n = 259)	Between 10 to 20 Years of Service (n = 93)	More than 20 Years of Service (n = 91)	F-Value	P-Value
Big-Five Personality Traits (Score Range: 2-10**)**					
Extraversion	5.22 ± 1.40	5.66 ± 1.68	6.12 ± 1.56	14.48*	<0.01
Agreeableness	8.31 ± 1.38	8.13 ± 1.77	8.35 ± 1.67	0.49	0.60
Conscientiousness	7.59 ± 1.62	8.11 ± 1.77	8.45 ± 1.59	10.22*	<0.01
Neuroticism	5.40 ± 1.58	5.47 ± 1.70	6.01 ± 1.68	5.86*	<0.01

Attributes	Less than 10 Years of Service (n = 259)	Between 10 to 20 Years of Service (n = 93)	More than 20 Years of Service (n = 91)	F-Value	P-Value
Openness	4.69 ± 1.58	4.50 ± 1.66	4.37 ± 1.78	1.73	0.17
Self-Actualization (Score Range: 15-60)	37.54 ± 5.42	36.75 ± 5.09	36.29 ± 4.60	2.58	0.07
Meaning in Life (Score Range: 5-35)					
Presence of Meaning	24.16 ± 3.60	25.16 ± 3.40	25.75 ± 3.40	8.52*	<0.01
Search for Meaning	24.46 ± 6.83	24.33 ± 7.31	24.33 ± 7.31	0.03	0.96
Total score	48.62 ± 7.97	49.49 ± 8.81	50.08 ± 8.80	1.74	0.17
Psychological Distress (Score Range: 0 -21)					
Stress	6.62 ± 3.50	7.48 ± 3.28	7.58 ± 3.28	4.66*	0.01
Anxiety	5.52 ± 3.86	6.01 ± 4.19	6.05 ± 4.19	6.16*	<0.01
Depression	4.65 ± 3.61	5.07 ± 3.39	5.08 ± 3.39	7.18*	<0.01
Total Score	16.80 ± 10.14	18.57 ± 9.74	18.71 ± 9.74	6.93*	<0.01

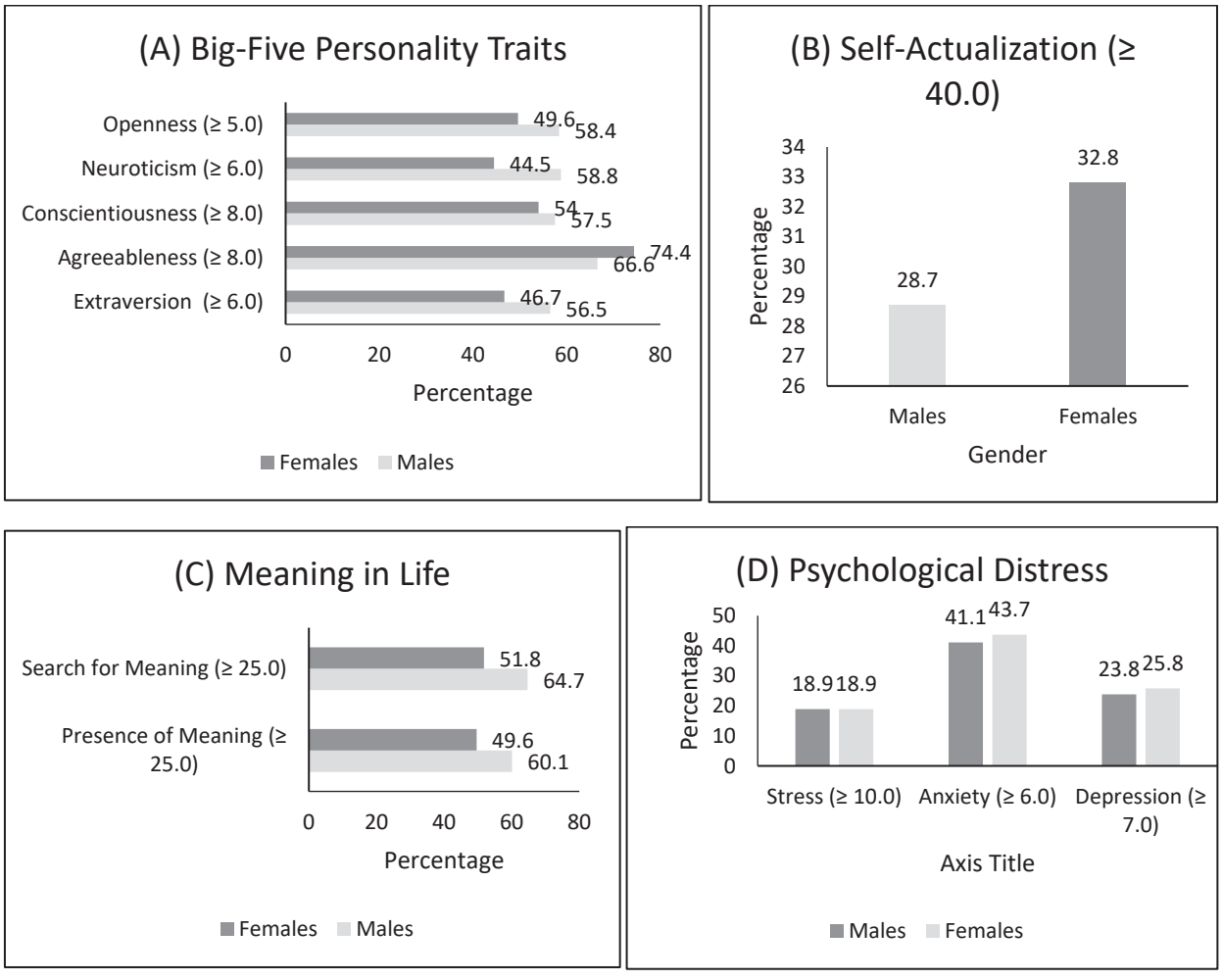

Fig. 1: Respondents with Above-Average Scores in Big-Five Personality Traits, Self-Actualization, Meaning in Life and Psychological Distress

The depression, anxiety and stress scale (DASS-21) utilised in the present study is a widely used measure of negative affect in adults and a substantial common factor for general psychological distress (Szabo, 2010). In the present study, gender differences were not observed in scores on stress, anxiety and depression (Table 1). However, females recorded a higher percentage of above-average scores in anxiety and depression than males (Fig. 1d). It is found that the psychological distress parameters were increased with the increased length of their service (Table 2). Consistent with previous research, interpersonal conflicts were a more frequently reported source of stress for women than men (Narayanan et al., 1999). However, the authors suggest such gender differences may disappear in higher-level jobs, such as the present case.

In the present study, extraversion, agreeableness, conscientiousness and neuroticism increase with age, while openness decreases with age; and this relationship is found to be stronger in males than females (Table 3). In a recent study on age variations within five personality traits indicates that from initial adulthood to middle ages, conscientiousness and agreeableness increase with age; neuroticism decreases; and extraversion and openness remain constant (Asselmann & Specht, 2021). Throughout early adulthood and up to the middle ages, extraversion will increase as many of us attempt to extend our social status by interacting with others both inside and outside of the workplace (Helson et al., 2006). Both conscientiousness and agreeableness will increase with age as they develop and internalise abstract ethical and social principles that promote pro-social and accountable behaviour (Eisenberg & Morris, 2004).

Self-actualisation, search for meaning and psychological distress are negatively associated; and the presence of meaning is positively associated with the chronological age of the participants (Table 3). Majority of people improve in managing their emotions as they grow and reduce stressful experiences (Helson & Soto, 2005), moreover, most adults establish strong relationships that become satisfying over time, and this acts as a buffer against stressors. Therefore, we tend to expect that levels of stress, anxiety and depression would show a negative age trend (Gorchoff et al., 2008).

Table 3: Inter-Correlations between Age and Other Attributes

Attributes	Males (n = 306)	Females (n = 137)	Overall (n = 443)
Big-Five Personality Traits			
Extraversion	0.229*	0.203*	0.241*
Agreeableness	0.107	0.161	0.023
Conscientiousness	0.260*	0.182	0.234*
Neuroticism	0.124	0.011	0.127
Openness	-0.097	-0.024	-0.048
Self-Actualization	-0.144	-0.065	-0.146
Meaning in Life			
Presence of Meaning	0.203*	0.040	0.165*
Search for Meaning	-0.039	-0.220	-0.036
Total Score	0.053	0.183	0.038
Psychological Distress			
Stress	-0.098	-0.011	-0.067
Anxiety	-0.212*	-0.013	-0.155
Depression	-0.214*	-0.020	-0.148
Total Score	-0.191	-0.001	-0.136

*Significant at 5%

Personality traits except neuroticism are positively associated with self-actualisation and meaning in life; whereas, they are negatively associated with psychological distress (Table 4). These results are typically in line with the existing literature. As an example, extraversion, neuroticism and conscientiousness are associated with different aspects of well-being (Sirgy, 2021). Alves et al. (2019) reported that personality factors play an important role in personal and work happiness and life satisfaction by influencing networks and organisational trust. People with high neuroticism traits possess a low level of psychological well-being because of irrational ideas and the inability to regulate their impulses and cope suitably with stress (Schumutte & Ryff, 1997; Ramesh, 2017). In a study on scientists, neuroticism was found to be

negatively associated with emotional intelligence and well-being (Ramesh, 2020). It was reported that high neuroticism and low conscientiousness predict internalising problems such as depression and anxiety (John et al., 2008).

Table 4: Inter-Correlations between Personality Traits and Other Attributes

Attributes	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Self-Actualization	0.003	0.211*	0.145	-0.020	0.210*
Meaning in Life					
Presence	0.122	0.054	0.135	-0.026	0.021
Search	0.032	0.033	0.090	-0.029	0.041
Total Score	0.080	0.005	0.020	-0.036	0.026
Psychological Distress					
Stress	-0.025	-0.265*	-0.233*	0.028	-0.104
Anxiety	-0.033	-0.277*	-0.291*	0.086	-0.116
Depression	-0.036	-0.319*	-0.307*	0.038	-0.199*
Total Score	-0.034	-0.314*	-0.303*	0.036	-0.151

*Significant at 5%

From earlier studies, Kaufman (2018) reported that self-actualisation was not significantly correlated with age, gender, education, race, ethnicity, or income but was significantly correlated with both meta traits of the Big Five (stability and plasticity) and their facets. Self-actualisation also showed strong linkages to multiple aspects of well-being and predicted work-related outcomes and creativity across multiple domains of achievement. According to Maslow (1967), self-actualisation is a vital, evolutionary process through which an individual aims to realise true potential after satisfying basic needs. A pilot study conducted by D'Souza et al. (2015) indicates that while the individual may claim to hold self-actualising beliefs and feelings, internal principles do not necessarily manifest self-actualising behaviour in everyday life. Jones and Crandall (1986) reported that higher scores in self-actualisation are also inner-directed, suggesting that they are guided by internalised motivations and principles rather than being influenced by others. Further, they have high self-esteem, are rational in their behaviour and thoughts, tend to be extroverted and are free of neurotic symptoms.

One important aspect of well-being, highlighted particularly in humanistic theories of the counseling process, is perceived meaning in life (Steger et al., 2006). In the present study, males have higher scores in meaning in life compared to females and it has increased with age. Steger and Frazier (2005) identified meaning in life as a potential mediator of the link between religiousness and psychological health. Baumeister (1991) proposed that a feeling of meaning can be attained by first meeting needs for values, purpose, efficiency and self-worth. Empirical research findings have shown the meaning in life scores correlated with a wide range of indicators of psychological distress and pathology. They were negatively correlated with depression, anxiety, perceived and experienced stress (Steger & Shin, 2010). Feeling one's life has meaning is important to human functioning. Those who felt their life to be meaningful were less depressed and felt greater satisfaction with their lives, greater self-esteem and optimism and more positive affect (Zika & Chamberlain, 1992).

CONCLUSIONS

The study concludes that males have higher extraversion and neuroticism among personality traits; meaning in life and similar levels of psychological distress, whereas females scored higher in self-actualisation. Extraversion, conscientiousness and presence of meaning were improved with age whereas, anxiety and depression were decreased with age and this relationship is stronger in males. Agreeableness and openness are the personality traits which were positively contribute to self-actualisation. Higher scores on neuroticism and lower scores on agreeableness, conscientiousness and openness were associated with increased levels of psychological distress.

IMPLICATIONS

The implications of the study include selection, training and creating possible organisational interventions to improve positive human functioning, which is a pre-requisite for any scientific achievement. Self-actualisation, having meaning in life and lower psychological distress among the scientific personnel indicate higher professional productivity. Since certain personality traits can predict the employee's well-being and their outcome, these traits can also be used in the selection and recruitment criteria. Another option is to train the employees to strengthen their psychological well-

being. Creating organisational interventions like offering professional counselling services to employees to seek greater purpose and meaning in life as part of their personal and professional growth and moving towards their self-actualisation potential.

LIMITATIONS

As the present study is conducted with a limited size of sample and a restricted battery of tests employed, the outcomes cannot be generalized. We used a shorter version of the BFI-10 and SISA, intended to reduce the testing time and to encourage the participants to respond despite their constraints. Further investigations are required to explore the role of other factors affecting these well-being attributes, which can be validated across cultures. Further in-depth studies are required to find out the cause-effect of the relationship between psychological well-being and professional productivity of scientists.

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