

Big Five personality traits

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The **Big Five personality traits**, also known as the **five factor model (FFM)**, is a widely examined theory of five broad dimensions used by some psychologists to describe the human personality and psyche.^{[1][2]} The five factors have been defined as **openness to experience, conscientiousness, extraversion, agreeableness**, and **neuroticism**. Acronyms to aid in remembering the five traits include **OCEAN** and **CANOE**. Beneath each proposed global factor, a number of correlated and more specific primary factors are claimed. For example, extraversion is said to include such related qualities as gregariousness, assertiveness, excitement seeking, warmth, activity, and positive emotions.^[3]

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Five factors

- **Openness to experience:** (*inventive/curious* vs. *consistent/cautious*). Appreciation for art, emotion, adventure, unusual ideas, curiosity, and variety of experience. Openness reflects the degree of intellectual curiosity, creativity and a preference for novelty and variety a person has. It is also described as the extent to which a person is imaginative or independent, and depicts a personal preference for a variety of activities over a strict routine. High openness can be perceived as unpredictability or lack of focus. Moreover, individuals with high openness are said to pursue self-actualization specifically by seeking out intense, euphoric experiences, such as skydiving, living abroad, gambling, et cetera. Conversely, those with low openness seek to gain fulfillment through perseverance, and are characterized as pragmatic and data-driven—sometimes even perceived to be dogmatic and closed-minded. Some disagreement remains about how to interpret and contextualize the openness factor.
- **Conscientiousness:** (*efficient/organized* vs. *easy-going/careless*). A tendency to be organized and dependable, show self-discipline, act dutifully, aim for achievement, and prefer planned rather than spontaneous behavior. High conscientiousness are often perceived as stubborn and obsessive. Low conscientiousness are flexible and spontaneous, but can be perceived as sloppy and unreliable.^[4]
- **Extraversion:** (*outgoing/energetic* vs. *solitary/reserved*). Energy, positive emotions, surgency, assertiveness, sociability and the tendency to seek stimulation in the company of others, and talkativeness. High extraversion is often perceived as attention-seeking, and domineering. Low extraversion causes a reserved, reflective personality, which can be perceived as aloof or self-absorbed.^[5]
- **Agreeableness:** (*friendly/compassionate* vs. *analytical/detached*). A tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others. It is also a measure of one's trusting and helpful nature, and whether a person is generally well-tempered or not. High agreeableness is often seen as naive or submissive. Low agreeableness personalities are often competitive or challenging people, which can be seen

as argumentative or untrustworthy.^[5]

- **Neuroticism:** (*sensitive/nervous* vs. *secure/confident*). The tendency to experience unpleasant emotions easily, such as anger, anxiety, depression, and vulnerability. Neuroticism also refers to the degree of emotional stability and impulse control and is sometimes referred to by its low pole, "emotional stability". A high need for stability manifests as a stable and calm personality, but can be seen as uninspiring and unconcerned. A low need for stability causes a reactive and excitable personality, often very dynamic individuals, but they can be perceived as unstable or insecure.^[5]

No Strong Preferences (all five dimensions): are adaptable, moderate and reasonable personalities, but can be perceived as unprincipled, inscrutable and calculating.^[5]

The Big Five Model was defined by several independent sets of researchers.^[6] These researchers began by studying known personality traits and then factor-analyzing hundreds of measures of these traits (in self-report and questionnaire data, peer ratings, and objective measures from experimental settings) in order to find the underlying factors of personality.^{[7][8][9][10][11]} The Big five personality traits was the model to comprehend the relationship between personality and academic behaviors.^[12]

The initial model was advanced by Ernest Tupes and Raymond Christal in 1961,^[13] but failed to reach an academic audience until the 1980s. In 1990, J.M. Digman advanced his five-factor model of personality, which Lewis Goldberg extended to the highest level of organization.^[14] These five overarching domains have been found to contain and subsume most known personality traits and are assumed to represent the basic structure behind all personality traits.^[15] These five factors provide a rich conceptual framework for integrating all the research findings and theory in personality psychology.

At least four sets of researchers have worked independently for decades on this problem and have identified generally the same five factors: Tupes and Cristal were first, followed by Goldberg at the Oregon Research Institute,^{[16][17][18][19][20]} Cattell at the University of Illinois,^{[9][21][22][23]} and Costa and McCrae at the National Institutes of Health.^{[24][25][26][27]} These four sets of researchers used somewhat different methods in finding the five traits, and thus each set of five factors has somewhat different names and definitions. However, all have been found to be highly inter-correlated and factor-analytically aligned.^{[28][29][30][31][32]} Studies indicate that the Big Five traits are not nearly as powerful in predicting and explaining actual behavior as are the more numerous facet or primary traits.^{[33][34]}

Each of the Big Five personality traits contains two separate, but correlated, aspects reflecting a level of personality below the broad domains but above the many facet scales that are also part of the Big Five.^[35] The aspects are labeled as follows: Volatility and Withdrawal for Neuroticism; Enthusiasm and Assertiveness for Extraversion; Intellect and Openness for Openness/Intellect; Industriousness and Orderliness for Conscientiousness; and Compassion and Politeness for Agreeableness.^[35]

Openness to experience

Openness is a general appreciation for art, emotion, adventure, unusual ideas, imagination, curiosity, and variety of experience. People who are open to experience are intellectually curious, open to emotion, sensitive to beauty and willing to try new things. They tend to be, when compared to closed people, more creative and more aware of their feelings. They are also more likely to hold unconventional beliefs.

A particular individual, however, may have a high overall openness score and be interested in learning and exploring new cultures but have no great interest in art or poetry. There is a strong connection between liberal ethics and openness to experience such as support for policies endorsing racial tolerance.^[36] Another characteristic of the open cognitive style is a facility for thinking in symbols and abstractions far removed from concrete experience. People with low scores on openness tend to have more conventional, traditional interests. They prefer the plain, straightforward, and obvious over the complex, ambiguous, and subtle. They may regard the arts and sciences with suspicion or view these endeavors as uninteresting. Closed people prefer familiarity over novelty; they are conservative and resistant to change.^[26]

Sample items

- I have a rich vocabulary.
- I have a vivid imagination.
- I have excellent ideas.
- I am quick to understand things.
- I use difficult words.
- I am full of ideas.
- I am not interested in abstractions. (*reversed*)
- I do not have a good imagination. (*reversed*)
- I have difficulty understanding abstract ideas. (*reversed*)^[37]

Conscientiousness

Conscientiousness is a tendency to show self-discipline, act dutifully, and aim for achievement against measures or outside expectations. It is related to the way in which people control, regulate, and direct their impulses. High scores on conscientiousness indicate a preference for planned rather than spontaneous behavior.^[38] The average level of conscientiousness rises among young adults and then declines among older adults.^[39]

Sample items

- I am always prepared.
- I pay attention to details.
- I get chores done right away.
- I like order.
- I follow a schedule.
- I am exacting in my work.
- I leave my belongings around. (*reversed*)
- I make a mess of things. (*reversed*)
- I often forget to put things back in their proper place. (*reversed*)
- I shirk my duties. (*reversed*)^[37]

Extraversion

Extraversion is characterized by breadth of activities (as opposed to depth), surgency from external activity/situations, and energy creation from external means.^[40] The trait is marked by pronounced engagement with the external world. Extraverts enjoy interacting with people, and are often perceived as full of energy. They tend to be enthusiastic, action-oriented individuals. They possess high group visibility, like to talk, and assert themselves.^[41]

Introverts have lower social engagement and energy levels than extraverts. They tend to seem quiet, low-key, deliberate, and less involved in the social world. Their lack of social involvement should not be interpreted as shyness or depression; instead they are more independent of their social world than extraverts. Introverts need less stimulation than extraverts and more time alone. This does not mean that they are unfriendly or antisocial; rather, they are reserved in social situations.^[42]

Sample items

- I am the life of the party.
- I don't mind being the center of attention.
- I feel comfortable around people.
- I start conversations.
- I talk to a lot of different people at parties.
- I don't talk a lot. (*reversed*)
- I think a lot before I speak or act. (*reversed*)
- I don't like to draw attention to myself. (*reversed*)
- I am quiet around strangers. (*reversed*)^[37]
- I have no intention of talking in large crowds. (*reversed*)

Agreeableness

The agreeableness trait reflects individual differences in general concern for social harmony. Agreeable individuals value getting along with others. They are generally considerate, kind, generous, trusting and trustworthy, helpful, and willing to compromise their interests with others.^[42] Agreeable people also have an optimistic view of human nature.

Disagreeable individuals place self-interest above getting along with others. They are generally unconcerned with others' well-being, and are less likely to extend themselves for other people. Sometimes their skepticism about others' motives causes them to be suspicious, unfriendly, and uncooperative.^[43]

Because agreeableness is a social trait, research has shown that one's agreeableness positively correlates with the quality of relationships with one's team members. Agreeableness also positively predicts transformational leadership skills. In a study conducted among 169 participants in leadership positions in a variety of professions, individuals were asked to take a personality test and have two evaluations completed by directly supervised subordinates. Leaders with high levels of agreeableness were more likely to be considered transformational rather than transactional. Although the relationship was not strong, ($r=0.32$, $\beta=0.28$, $p<0.01$) it was the strongest of the Big Five traits. However, the same study showed no predictive power of leadership effectiveness as evaluated by the leader's direct supervisor.^[44] Agreeableness, however, has been found to be negatively related to transactional leadership in the military. A study of Asian military units showed leaders with a high level of agreeableness to be more likely to receive a low rating for transformational leadership skills.^[45] Therefore, with further research organizations may be able to determine an individual's potential for performance based on their personality traits.

Sample items

- I am interested in people.
- I sympathize with others' feelings.
- I have a soft heart.
- I take time out for others.
- I feel others' emotions.
- I make people feel at ease.
- I am not really interested in others. (*reversed*)
- I insult people. (*reversed*)
- I am not interested in other people's problems. (*reversed*)
- I feel little concern for others. (*reversed*)^[37]

Neuroticism

Neuroticism is the tendency to experience negative emotions, such as anger, anxiety, or depression.^[46] It is sometimes called emotional instability, or is reversed and referred to as emotional stability. According to Eysenck's (1967) theory of personality, neuroticism is interlinked with low tolerance for stress or aversive stimuli.^[47] Those who score high in neuroticism are emotionally reactive and vulnerable to stress. They are more likely to interpret ordinary situations as threatening, and minor frustrations as hopelessly difficult. Their negative emotional reactions tend to persist for unusually long periods of time, which means they are often in a bad mood. For instance, neuroticism is connected to a pessimistic approach toward work, confidence that work impedes personal relationships, and apparent anxiety linked with work.^[48] Furthermore, those who score high on neuroticism may display more skin conductance reactivity than those who score low on neuroticism.^{[47][49]} These problems in emotional regulation can diminish the ability of a person scoring high on neuroticism to think clearly, make decisions, and cope effectively with stress. Lacking contentment in one's life achievements can correlate with high neuroticism scores and increase one's likelihood of falling into clinical depression.^[50] Moreover, individuals high in neuroticism tend to experience more negative life events,^{[46][51]} but neuroticism also changes in response to positive and negative life experiences.^{[46][51]}

At the other end of the scale, individuals who score low in neuroticism are less easily upset and are less emotionally reactive. They tend to be calm, emotionally stable, and free from persistent negative feelings. Freedom from negative feelings does not mean that low scorers experience a lot of positive feelings.^[52]

Neuroticism is similar but not identical to being neurotic in the Freudian sense (i.e., neurosis.) Some psychologists prefer to call neuroticism by the term

emotional stability to differentiate it from the term neurotic in a career test.

Sample items

- I am easily disturbed.
- I change my mood a lot.
- I get irritated easily.
- I get stressed out easily.
- I get upset easily.
- I have frequent mood swings.
- I worry about things.
- I am much more anxious than most people.^[53]
- I am relaxed most of the time. (*reversed*)
- I seldom feel blue. (*reversed*)^[37]

History

Early trait research

In 1884, Sir Francis Galton was the first person who is known to have investigated the hypothesis that it is possible to derive a comprehensive taxonomy of human personality traits by sampling language: the lexical hypothesis.^[7] In 1936, Gordon Allport and S. Odbert put Sir Francis Galton’s hypothesis into practice by extracting 4,504 adjectives which they believed were descriptive of observable and relatively permanent traits from the dictionaries at that time.^[54] In 1940, Raymond Cattell retained the adjectives, and eliminated synonyms to reduce the total to 171.^[9] He constructed a self-report instrument for the clusters of personality traits he found from the adjectives, which he called the Sixteen Personality Factor Questionnaire. Based on a subset of only 20 of the 36 dimensions that Cattell had originally discovered, Ernest Tupes and Raymond Christal claimed to have found just five broad factors which they labeled: "surgency", "agreeableness", "dependability", "emotional stability", and "culture".^[10] Warren Norman subsequently relabeled "dependability" as "conscientiousness".^[11]

Hiatus in research

For the next two decades, the changing zeitgeist made publication of personality research difficult. In his 1968 book *Personality and Assessment*, Walter Mischel asserted that personality instruments could not predict behavior with a correlation of more than 0.3. Social psychologists like Mischel argued that attitudes and behavior were not stable, but varied with the situation. Predicting behavior from personality instruments was claimed to be impossible. However, it has subsequently been demonstrated empirically that the magnitude of the predictive correlations with real-life criteria can increase significantly under stressful emotional conditions (as opposed to the typical administration of personality measures under neutral emotional conditions), thereby accounting for a significantly greater proportion of the predictive variance.^[55]

In addition, emerging methodologies challenged this point of view during the 1980s. Instead of trying to predict single instances of behavior, which was unreliable, researchers found that they could predict patterns of behavior by aggregating large numbers of observations.^[56] As a result, correlations between personality and behavior increased substantially, and it was clear that "personality" did in fact exist.^[57] Personality and social psychologists now generally agree that both personal and situational variables are needed to account for human behavior.^[58] Trait theories became justified, and there was a resurgence of interest in this area.^[59] In the 1980s, Lewis Goldberg started his own lexical project, emphasizing five broad factors once again.^[60] He later coined the term "Big Five" as a label for the factors.

Renewed attention

In a 1980 symposium in Honolulu, four prominent researchers, Lewis Goldberg, Naomi Takemoto-Chock, Andrew Comrey, and John M. Digman, reviewed the available personality instruments of the day.^[61] This event was followed by widespread acceptance of the five-factor model among personality researchers during the 1980s.^[62] Peter Saville and his team included the five-factor "Pentagon" model with the original OPQ in 1984. Pentagon was closely followed by the NEO five-factor personality inventory, published by Costa and McCrae in 1985. However, the methodology employed in constructing the NEO-PI-R instrument has been subjected to critical scrutiny (see section below).^[63]

Biological and developmental factors

Heritability

Twin studies suggest that heritability and environmental factors both influence all five factors to the same degree.^[64] Among four recent twin studies, the mean percentage for heritability was calculated for each personality and it was concluded that heritability influenced the five factors broadly. The self-report measures were as follows: openness to experience was estimated to have a 57% genetic influence, extraversion 54%, conscientiousness 49%, neuroticism 48%, and agreeableness 42%.^[65]

Development during childhood and adolescence

Research on the Big Five, and personality in general, has focused primarily on individual differences in adulthood, rather than in childhood and adolescence.^{[66][67][68]} Yet, recent studies have begun to explore the developmental origins and trajectories of the Big Five among children and adolescents.^{[66][67][68]} Contrary to some researchers who question whether children have stable personality traits, Big Five or otherwise,^[69] most researchers contend that there are significant psychological differences between children that are associated with relatively stable, distinct, and salient behavior patterns.^{[66][67][68]} Some of these differences are evident at, if not before, birth.^{[67][68]} For example, both parents and researchers recognize that some newborn infants are peaceful and easily soothed while others are comparatively fussy and hard to calm.^[68]



Personality research conducted on twin subjects suggest that both heritability and environmental factors contribute to the Big Five personality traits.

Although developmental psychologists generally interpret individual differences in children as evidence of temperament rather than personality traits,^[67] some researchers argue that temperaments and personality traits are age-specific manifestations of virtually the same latent qualities.^{[68][70]} Alternatively, early childhood temperaments may become adolescent and adult personality traits as individuals' basic genetic characteristics actively, reactively, and passively interact with their changing environments.^{[66][67][68]}

The structure, manifestations, and development of the Big Five in childhood and adolescence has been studied using a variety of methods, including parent- and teacher-ratings,^{[71][72][73]} preadolescent and adolescent self- and peer-ratings,^{[74][75][76]} and observations of parent-child interactions.^[66] Results from these studies support the relative stability of personality traits across the human lifespan, at least from preschool age through adulthood.^{[66][68][77][78]} More specifically, research suggests that four of the Big Five –namely Extraversion, Neuroticism, Conscientiousness, and Agreeableness–reliably describe personality differences in childhood, adolescence, and adulthood.^{[66][68][77][78]} However, some evidence suggests that Openness may not be a fundamental, stable part of childhood personality. Although some researchers have found that Openness in children and adolescents relates to attributes such as creativity, curiosity, imagination, and intellect,^[79] many researchers have failed to find distinct individual differences in Openness in childhood and early adolescence.^{[66][68]} Potentially, Openness may (a) manifest in unique, currently unknown ways in childhood or (b) may only manifest as children develop socially and cognitively.^{[66][68]} Other studies have found evidence for all of the Big Five traits in childhood and adolescence as well as two other child-specific traits: Irritability and Activity.^[80] Despite these specific differences, the majority of findings suggest that personality traits –particularly Extraversion, Neuroticism, Conscientiousness, and Agreeableness– are evident in childhood and adolescence and are associated with distinct social-emotional patterns of behavior that are largely consistent with adult manifestations of those same personality traits.^{[66][68][77][78]}

Extraversion/positive emotionality

In Big Five studies, extraversion has been associated with surgency.^[67] Children with high Extraversion are energetic, talkative, social, and dominant with children and adults; whereas, children with low Extraversion tend to be quiet, calm, inhibited, and submissive to other children and adults.^{[66][68]} Individual differences in Extraversion first manifest in infancy as varying levels of positive emotionality.^[81] These differences in turn predict social and physical activity during later childhood and may represent, or be associated with, the behavioral activation system.^{[67][68]} In children, Extraversion/Positive Emotionality includes four sub-traits: *activity*, *dominance*, *shyness*, and *sociability*.

- **Activity:** Children with high activity tend to have high energy levels and more intense and frequent motor activity compared to their peers.^{[68][71][82]} Salient differences in activity reliably manifest in infancy, persist through adolescence, and fade as motor activity decreases in adulthood^[83] or potentially develops into talkativeness.^{[68][84]}
- **Dominance:** Children with high dominance tend to influence the behavior of others, particularly their peers, to obtain desirable rewards or outcomes.^{[68][85][86]} Such children are generally skilled at organizing activities and games^[87] and deceiving others by controlling their nonverbal behavior.^[88]
- **Shyness:** Children with high shyness are generally socially withdrawn, nervous, and inhibited around strangers.^[68] In time, such children may become fearful even around "known others", especially if their peers reject them.^{[68][89]}
- **Sociability:** Children with high sociability generally prefer to be with others rather than alone.^{[68][90]} During middle childhood, the distinction between low sociability and high shyness becomes more pronounced, particularly as children gain greater control over how and where they spend their time.^{[68][91][92]}

Development throughout adulthood

Many studies of longitudinal data, which correlate people's test scores over time, and cross-sectional data, which compare personality levels across different age groups, show a high degree of stability in personality traits during adulthood.^[93] It is shown that the personality stabilizes for working-age individuals within about four years after starting working. There is also little evidence that adverse life events can have any significant impact on the personality of individuals.^[94] More recent research and meta-analyses of previous studies, however, indicate that change occurs in all five traits at various points in the lifespan. The new research shows evidence for a maturation effect. On average, levels of agreeableness and conscientiousness typically increase with time, whereas extraversion, neuroticism, and openness tend to decrease.^[95] Research has also demonstrated that changes in Big Five personality traits depend on the individual's current stage of development. For example, levels of agreeableness and conscientiousness demonstrate a negative trend during childhood and early adolescence before trending upwards during late adolescence and into adulthood.^[96] In addition to these group effects, there are individual differences: different people demonstrate unique patterns of change at all stages of life.^[97]

In addition, some research (Fleeson, 2001) suggests that the Big Five should not be conceived of as dichotomies (such as extraversion vs. introversion) but as continua. Each individual has the capacity to move along each dimension as circumstances (social or temporal) change. He is or she is therefore not simply on one end of each trait dichotomy but is a blend of both, exhibiting some characteristics more often than others:^[98]

Research regarding personality with growing age has suggested that as individuals enter their elder years (79–86), those with lower IQ see a raise in extraversion, but a decline in conscientiousness and physical well being.^[99]

Research by Cobb-Clark and Schurer indicates that personality traits are generally stable among adult workers. The research done on personality also mirrors previous results on locus of control.^[100]

Brain structures

Some research has been done to look into the structures of the brain and their connections to personality traits of the FFM. Two main studies were done by Sato et al. (2012)^[101] and DeYoung et al. (2009).^[102] Results of the two are as follows:

- Neuroticism: negatively correlated with ratio of brain volume to remainder of intracranial volume, reduced volume in dorsomedial PFC and a segment of left medial temporal lobe, including posterior hippocampus, increased volume in the mid-cingulate gyrus.
- Extraversion: positively correlated with orbitofrontal cortex metabolism, increased cerebral volume of medial orbitofrontal cortex.
- Agreeableness: negatively correlated with left orbitofrontal lobe volume in frontotemporal dementia patients, reduced volume in posterior left superior temporal sulcus, increased volume in posterior cingulate cortex.
- Conscientiousness: increased volume of middle frontal gyrus in left lateral PFC.
- Openness to experience: no regions large enough to be significant, although parietal cortex may be involved.

Group differences

Gender differences

Cross-cultural research has shown some patterns of gender differences on responses to the NEO-PI-R and the Big Five Inventory.^[103] For example, women consistently report higher Neuroticism, Agreeableness, warmth (an extraversion facet) and openness to feelings, and men often report higher assertiveness (a facet of extraversion) and openness to ideas as assessed by the NEO-PI-R.^[104]

A study of gender differences in 55 nations using the Big Five Inventory found that women tended to be somewhat higher than men in neuroticism, extraversion, agreeableness, and conscientiousness. The difference in neuroticism was the most prominent and consistent, with significant differences found in 49 of the 55 nations surveyed. Gender differences in personality traits are largest in prosperous, healthy, and more gender-egalitarian cultures. A plausible explanation for this is that acts by women in individualistic, egalitarian countries are more likely to be attributed to their personality, rather than being attributed to ascribed gender roles within collectivist, traditional countries.^[104] Differences in the magnitude of sex differences between more or less developed world regions were due to differences between men, not women, in these respective regions. That is, men in highly developed world regions were less neurotic, extraverted, conscientious and agreeable compared to men in less developed world regions. Women, on the other hand tended not to differ in personality traits across regions.^[105] The authors of this study speculated that resource-poor environments (that is, countries with low levels of development) may inhibit the development of gender differences, whereas resource-rich environments facilitate them. This may be because males require more resources than females in order to reach their full developmental potential. The authors also argued that due to different evolutionary pressures, men may have evolved to be more risk taking and socially dominant, whereas women evolved to be more cautious and nurturing. Ancient hunter-gatherer societies may have been more egalitarian than later agriculturally oriented societies. Hence, the development of gender inequalities may have acted to constrain the development of gender differences in personality that originally evolved in hunter-gatherer societies. As modern societies have become more egalitarian, again, it may be that innate sex differences are no longer constrained and hence manifest more fully than in less-developed cultures. Currently, this hypothesis remains untested, as gender differences in modern societies have not been compared with those in hunter-gatherer societies.^[105]

Birth-order differences

Frank Sulloway argues that firstborns are more conscientious, more socially dominant, less agreeable, and less open to new ideas compared to laterborns. Large scale studies using random samples and self-report personality tests, however, have found milder effects than Sulloway claimed, or no significant effects of birth order on personality.^{[106][107]}

Cultural differences

The Big Five have been replicated in a variety of languages and cultures, such as German,^[108] Chinese,^[109] Indian,^[110] etc.^[111] For example, Thompson has demonstrated the Big Five structure across several cultures using an international English language scale.^[112] Cheung, van de Vijver, and Leong (2011) suggest, however, that the Openness factor is particularly unsupported in Asian countries and that a different fifth factor is sometimes identified.^[113]

Recent work has found relationships between Geert Hofstede’s cultural factors, Individualism, Power Distance, Masculinity, and Uncertainty Avoidance, with the average Big Five scores in a country.^[114] For instance, the degree to which a country values individualism correlates with its average extraversion, whereas people living in cultures which are accepting of large inequalities in their power structures tend to score somewhat higher on conscientiousness. Although this is an active area of research, the reasons for these differences are as yet unknown.

Attempts to replicate the Big Five in other countries with local dictionaries have succeeded in some countries but not in others. Apparently, for instance, Hungarians do not appear to have a single agreeableness factor.^[115] Other researchers have found evidence for agreeableness but not for other factors.^[116]

Relationships

Personality disorders

As of 2002, there were over fifty published studies relating the FFM to personality disorders.^[117] Since that time, quite a number of additional studies have expanded on this research base and provided further empirical support for understanding the DSM personality disorders in terms of the FFM domains.^[118]

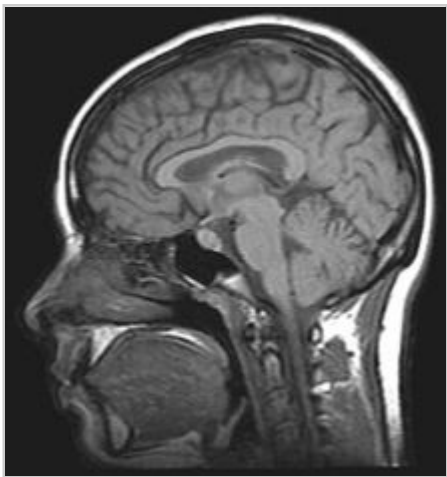
In her seminal review of the personality disorder literature published in 2007, Lee Anna Clark asserted that "the five-factor model of personality is widely accepted as representing the higher-order structure of both normal and abnormal personality traits".^[119]

The five-factor model has been shown to significantly predict all ten personality disorder symptoms and outperform the Minnesota Multiphasic Personality Inventory (MMPI) in the prediction of borderline, avoidant, and dependent personality disorder symptoms.^[120]

Research results examining the relationships between the FFM and each of the ten DSM personality disorder diagnostic categories are widely available. For example, in a study published in 2003 titled "The five-factor model and personality disorder empirical literature: A meta-analytic review",^[121] the authors analyzed data from 15 other studies to determine how personality disorders are different and similar, respectively, with regard to underlying personality traits. In terms of how personality disorders differ, the results showed that each disorder displays a FFM profile that is meaningful and predictable given its unique diagnostic criteria. With regard to their similarities, the findings revealed that the most prominent and consistent personality dimensions underlying a large number of the personality disorders are positive associations with neuroticism and negative associations with agreeableness.

Common mental disorders

Converging evidence from several nationally representative studies has established three classes of mental disorders which are especially common in the general population: Depressive disorders (e.g., Major Depressive Disorder (MDD), Dysthymic Disorder),^[122] anxiety disorders (e.g., Generalized Anxiety Disorder (GAD), Post-Traumatic Stress Disorder (PTSD), Panic Disorder, Agoraphobia, Specific Phobia, and Social Phobia),^[122] and substance use



Important research on personality traits and brain structures have been conducted, providing correlations between the Big Five personality traits and specific areas of the brain.

disorders (SUDs).^{[123][124]} These common mental disorders (CMDs) have been empirically linked to the Big Five personality traits, neuroticism in particular. Numerous studies have found that having high scores of neuroticism significantly increases one's risk for developing a CMD.^{[125][126]} A large-scale meta-analysis (n > 75,000) examining the relationship between all of the Big Five personality traits and CMDs found that low conscientiousness yielded consistently strong effects for each CMD examined (i.e., MDD, Dysthymic Disorder, GAD, PTSD, Panic Disorder, Agoraphobia, Social Phobia, Specific Phobia, and SUD).^[127] This finding parallels research on physical health, which has established that conscientiousness is the strongest personality predictor of mortality and is highly correlated with making poor health choices.^{[128][129]} In regards to the other personality domains, the meta-analysis found that all CMDs examined were defined by high neuroticism, most exhibited low extraversion, only SUD was linked to agreeableness (negatively), and no disorders were associated with Openness.^[127]

The Personality-Psychopathology Models

Five major models have been posed to explain the nature of the relationship between personality and mental illness. There is currently no single "best model", as each of them has received at least some empirical support. It is also important to note that these models are not mutually exclusive - more than one may be operating for a particular individual and various mental disorders may be explained by different models.^[130]

- **The Vulnerability/Risk Model:** According to this model, personality contributes to the onset or etiology of various common mental disorders. In other words, pre-existing personality traits either cause the development of CMDs directly or enhance the impact of causal risk factors.^{[127][131][132][133]}
- **The Pathoplasty Model:** This model proposes that premorbid personality traits impact the expression, course, severity, and/or treatment response of a mental disorder.^{[127][132][134]} An example of this relationship would be a heightened likelihood of committing suicide for a depressed individual who also has low levels of constraint.^[132]
- **The Common Cause Model:** According to the common cause model, personality traits are predictive of CMDs because personality and psychopathology have shared genetic and environmental determinants which result in non-causal associations between the two constructs.^{[127][131]}
- **The Spectrum Model:** This model proposes that associations between personality and psychopathology are found because these two constructs both occupy a single domain or spectrum and psychopathology is simply a display of the extremes of normal personality function.^{[127][131][132][133]} Support for this model is provided by an issue of criterion overlap. For instance, two of the primary facet scales of neuroticism in the NEO-PI-R are "depression" and "anxiety". Thus the fact that diagnostic criteria for depression, anxiety, and neuroticism assess the same content increases the correlations between these domains.^[133]
- **The Scar Model:** According to the scar model, episodes of a mental disorder 'scar' an individual's personality, changing it in significant ways from premorbid functioning.^{[127][131][132][133]} An example of a scar effect would be a decrease in openness to experience following an episode of PTSD.^[132]

Education

Academic achievement

Personality plays an important role that affects academic achievement. A study conducted with 308 undergraduates who completed the Five Factor Inventory Processes and offered their GPA suggested that conscientiousness and agreeableness have a positive relationship with all types of learning styles (synthesis analysis, methodical study, fact retention, and elaborative processing), whereas neuroticism has an inverse relationship with them all. Moreover, extraversion and openness were proportional to elaborative processing. The Big Five personality traits accounted for 14% of the variance in GPA, suggesting that personality traits make some contributions to academic performance. Furthermore, reflective learning styles (synthesis-analysis and elaborative processing) were able to mediate the relationship between openness and GPA. These results indicate that intellectual curiousness has significant enhancement in academic performance if students can combine their scholarly interest with thoughtful information processing.^[135]

Studies conducted on college students have concluded that hope, which is linked to agreeableness, has a positive effect on psychological well being. Individuals high in neurotic tendencies are less likely to display hopeful tendencies and are negatively associated with well-being.^[136] Personality can sometimes be flexible and measuring the big five personality for individuals as they enter certain stages of life may predict their educational identity. Recent studies have suggested the likelihood of an individual's personality affecting their educational identity.^[137]

Learning styles

Learning styles have been described as "enduring ways of thinking and processing information."^[138]

Although there is no evidence that personality determines thinking styles, they may be intertwined in ways that link thinking styles to the Big Five personality traits.^[139] There is no general consensus on the number or specifications of particular learning styles, but there have been many different proposals.

Smeck, Ribicj, and Ramanaih (1997) defined four types of learning styles:

- synthesis analysis
- methodical study
- fact retention
- elaborative processing

When all four facets are implicated within the classroom, they will each likely improve academic achievement.^[140] This model asserts that students develop either agentic/shallow processing or reflective/deep processing. Deep processors are more often than not found to be more conscientious, intellectually open, and extraverted when compared to shallow processors. Deep processing is associated with appropriate study methods (methodical study) and a stronger ability to analyze information (synthesis analysis), whereas shallow processors prefer structured fact retention learning styles and are better suited for elaborative processing.^[140] The main functions of these four specific learning styles are as follow:

Name	Function
Synthesis analysis:	processing information, forming categories, and organizing them into hierarchies. This is the only one of the learning styles that has explained a significant impact on academic performance. ^[140]
Methodical study:	methodical behavior while completing academic assignments
Fact retention:	focusing on the actual result instead of understanding the logic behind something
Elaborative processing:	connecting and applying new ideas to existing knowledge

Openness has been linked to learning styles that often lead to academic success and higher grades like synthesis analysis and methodical study. Because conscientiousness and openness have been shown to predict all four learning styles, it suggests that individuals who possess characteristics like discipline, determination, and curiosity are more likely to engage in all of the above learning styles.^[140]

According to the research carried out by Komarraju, Karau, Schmeck & Avdic (2011), conscientiousness and agreeableness are positively related with all four learning styles, whereas neuroticism was negatively related with those four. Furthermore, extraversion and openness were only positively related to elaborative processing, and openness itself correlated with higher academic achievement.^[141]

Besides openness, all Big Five personality traits helped predict the educational identity of students. Based on these findings, scientists are beginning to see that there might be a large influence of the Big Five traits on academic motivation that then leads to predicting a student's academic performance.^[142]

Recent studies suggest that Big Five personality traits combined with learning styles can help predict some variations in the academic performance and the academic motivation of an individual which can then influence their academic achievements.^[143] This may be seen because individual differences in personality represent stable approaches to information processing. For instance, conscientiousness has consistently emerged as a stable predictor of success in exam performance, largely because conscientious students experiences fewer study delays.^[142] The reason conscientiousness shows a positive association with the four learning styles is because students with high levels of conscientiousness develop focused learning strategies and appear to be more disciplined and achievement-oriented.

However, the American Psychological Society recently commissioned a report whose conclusion indicates that no significant evidence exists to make the conclusion that learning-style assessments should be included in the education system. The APA also suggested in their report that all existing learning styles have not been exhausted and that there could exist learning styles that have the potential to be worthy of being included in educational practices.^[144] Thus, it is premature, at best, to conclude that the evidence linking the Big Five to "learning styles" or "learning styles" to learning itself is valid.

Work success

It is believed that the Big Five traits are predictors of future performance outcomes. Job outcome measures include job and training proficiency and personnel data.^[145] However, research demonstrating such prediction has been criticized, in part because of the apparently low correlation coefficients characterizing the relationship between personality and job performance. In a 2007 article^[146] co-authored by six current or former editors of psychological journals, Dr. Kevin Murphy, Professor of Psychology at Pennsylvania State University and Editor of the *Journal of Applied Psychology* (1996-2002), states:

The problem with personality tests is ... that the validity of personality measures as predictors of job performance is often disappointingly low. The argument for using personality tests to predict performance does not strike me as convincing in the first place.



Controversy exists as to whether or not the Big 5 personality traits are correlated with success in the workplace.

Such criticisms were put forward by Walter Mischel,^[147] whose publication caused a two-decades' long crisis in personality psychometrics. However, later work demonstrated (1) that the correlations obtained by psychometric personality researchers were actually very respectable by comparative standards,^[148] and (2) that the economic value of even incremental increases in prediction accuracy was exceptionally large, given the vast difference in performance by those who occupy complex job positions.^[149]

There have been studies that link national innovation to openness to experience and conscientiousness. Those who express these traits have showed leadership and beneficial ideas towards the country of origin.^[150]

Some businesses, organizations, and interviewers assess individuals based on the Big Five personality traits. Research has suggested that individuals who are considered leaders typically exhibit lower amounts of neurotic traits, maintain higher levels of openness (envisioning success), balanced levels of conscientiousness (well-organized), and balanced levels of extraversion (outgoing, but not excessive).^[151] Further studies have linked professional burnout to neuroticism, and extraversion to enduring positive work experience.^[152] When it comes to making money, research has suggested that those who are high in agreeableness (especially men) are not as successful in accumulating income.^[153]

Non-humans

The Big Five personality traits have been assessed in some non-human species. In one series of studies, human ratings of chimpanzees using the Chimpanzee Personality Questionnaire (CPQ) revealed factors of extraversion, conscientiousness and agreeableness – as well as an additional factor of dominance – across hundreds of chimpanzees in zoological parks, a large naturalistic sanctuary, and a research laboratory. Neuroticism and openness factors were found in an original zoo sample, but were not replicated in a new zoo sample or in other settings (perhaps reflecting the design of the CPQ).^[154] A study review found that markers for the three dimensions extraversion, neuroticism, and agreeableness were found most consistently across different species, followed by openness; only chimpanzees showed markers for conscientious behavior.^[155]

Measurements

Several measures of the Big Five exist:

- International Personality Item Pool (IPIP)^[156]
- NEO-PI-R
- The Ten-Item Personality Inventory (TIPI) and the Five Item Personality Inventory (FIPI) are very abbreviated rating forms of the Big Five personality traits.^[157]
- Self-descriptive sentence questionnaires^[116]
- Lexical questionnaires^[158]
- Self-report questionnaires^[159]
- Relative-scored Big 5 measure^[160]



The Big 5 personality traits can be seen in chimpanzees.

The most frequently used measures of the Big Five comprise either items that are self-descriptive sentences^[116] or, in the case of lexical measures, items that are single adjectives.^[158] Due to the length of sentence-based and some lexical measures, short forms have been developed and validated for use in applied research settings where questionnaire space and respondent time are limited, such as the 40-item balanced *International English Big-Five Mini-Markers*^[112] or a very brief (10 item) measure of the Big Five domains.^[161] Research has suggested that some methodologies in administering personality tests are inadequate in length and provide insufficient detail to truly evaluate personality. Usually, longer, more detailed questions will give a more accurate portrayal of personality.^[162] The five factor structure has been replicated in peer reports.^[163] However, many of the substantive findings rely on self-reports.

Much of the evidence on the measures of the Big 5 relies on self-report questionnaires, which makes self-report bias and falsification of responses difficult to deal with and account for.^[159] It has been argued that the Big Five tests do not create an accurate personality profile because the responses given on these tests are not true in all cases. For example, questionnaires are answered by potential employees who might choose answers that paint them in the best light.^[164] This becomes especially important when considering why scores may differ between individuals or groups of people— differences in scores may represent genuine underlying personality differences, or they may simply be an artifact of the way the subjects answered the questions.

Research suggests that a relative-scored Big Five measure in which respondents had to make repeated choices between equally desirable personality descriptors may be a potential alternative to traditional Big Five measures in accurately assessing personality traits, especially when lying or biased responding is present.^[160] When compared with a traditional Big Five measure for its ability to predict GPA and creative achievement under both normal and "fake good"-bias response conditions, the relative-scored measure significantly and consistently predicted these outcomes under both conditions; however, the Likert questionnaire lost its predictive ability in the faking condition. Thus, the relative-scored measure proved to be less affected by biased responding than the Likert measure of the Big Five.

Andrew H. Schwartz analyzed 700 million words, phrases, and topic instances collected from the Facebook messages of 75,000 volunteers, who also took standard personality tests, and found striking variations in language with personality, gender, and age.^[165] Schwartz's research is a departure from many of the efforts that other researchers have made in that it uses data that was not taken specifically in order to determine personality.

Critique

The proposed Big Five model has been subjected to considerable critical scrutiny^{[166][167][168][169]} and defense for the model.^[170] Subsequent critical replies by Jack Block at the University of California Berkeley followed.^{[171][172][173]} It has been argued that there are limitations to the scope of the Big Five model as an explanatory or predictive theory.^[174] It has also been argued that measures of the Big Five account for only 56% of the normal personality trait sphere alone (not even considering the abnormal personality trait sphere).^[63] Also the static Big Five^[175] is not theory-driven, it is merely a data-driven investigation of certain descriptors that tend to cluster together often based on less than optimal factor analytic procedures.^[63] Measures of the Big Five constructs appear to show some consistency in interviews, self-descriptions and observations, and this static five-factor structure seems to be found across a wide range of participants of different ages and cultures.^[176] However, while genotypic temperament trait dimensions might appear across different cultures, the phenotypic expression of personality traits differs profoundly across different cultures as a function of the different socio-cultural conditioning and experiential learning that takes place within different cultural settings.^[177]

Limited scope

One common criticism is that the Big Five does not explain all of human personality. Some psychologists have dissented from the model precisely because they feel it neglects other domains of personality, such as religiosity, manipulateness/machiavellianism, honesty, sexiness/seductiveness, thriftiness, conservativeness, masculinity/femininity, snobbishness/egotism, sense of humour, and risk-taking/thrill-seeking.^{[178][179]} Dan P. McAdams has called the Big Five a "psychology of the stranger", because they refer to traits that are relatively easy to observe in a stranger; other aspects of personality that are more privately held or more context-dependent are excluded from the Big Five.^[180]

In many studies, the five factors are not fully orthogonal to one another; that is, the five factors are not independent.^{[181][182]} Orthogonality is viewed as desirable by some researchers because it minimizes redundancy between the dimensions. This is particularly important when the goal of a study is to provide a comprehensive description of personality with as few variables as possible.

Methodological issues

Factor analysis, the statistical method used to identify the dimensional structure of observed variables, lacks a universally recognized basis for choosing among solutions with different numbers of factors.^[183] A five factor solution depends on some degree of interpretation by the analyst. A larger number of factors may, in fact, underlie these five factors. This has led to disputes about the "true" number of factors. Big Five proponents have responded that although other solutions may be viable in a single dataset, only the five factor structure consistently replicates across different studies.^[184]

Theoretical status

A frequent criticism is that the Big Five is not based on any underlying theory; it is merely an empirical finding that certain descriptors cluster together under factor analysis.^[183] Although this does not mean that these five factors do not exist, the underlying causes behind them are unknown.

Jack Block's final published work before his death in January 2010 drew together his lifetime perspective on the five-factor model.^[185]

He summarized his critique of the model in terms of:

- the atheoretical nature of the five-factors.
- their "cloudy" measurement.
- the model’s inappropriateness for studying early childhood.
- the use of factor analysis as the exclusive paradigm for conceptualizing personality.
- the continuing non-consensual understandings of the five-factors.
- the existence of unrecognized but successful efforts to specify aspects of character not subsumed by the five-factors.

He went on to suggest that repeatedly observed higher order factors hierarchically above the proclaimed Big Five personality traits may promise deeper biological understanding of the origins and implications of these superfactors.

See also

- Core self-evaluations
- Goal orientation
- DISC assessment
- Facet
- HEXACO model of personality structure
- Moral Foundations Theory
- Myers-Briggs Type Indicator
- Personality psychology
- Szondi test
- Trait theory

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External links

- International Personality Item Pool (<http://ipip.ori.org/>), public domain list of items keyed to the big five personality traits.
- Selection from the "Handbook of personality: Theory and research" (<http://www.ocf.berkeley.edu/~johnlab/bigfive.htm>) for researchers
- Video (https://www.youtube.com/watch?v=-avoCvBR_zk) YouTube video showing the distribution of the Big Five personality traits on a world map.
- Video (<https://www.youtube.com/watch?v=2SrPoIsI42U>) YouTube video showing the history and statistics of the Big Five personality test.
- Regional Personality Differences in Great Britain (<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0122245>)

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