

# Big Five personality traits

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In contemporary psychology, the "**Big Five**" factors (or **Five Factor Model**; **FFM**) of personality are five broad domains or dimensions of personality that are used to describe human personality.

The Big Five framework of personality traits from Costa & McCrae, 1992 has emerged as a robust model for understanding the relationship between personality and various academic behaviors.<sup>[1]</sup> The Big Five factors are openness, conscientiousness, extraversion, agreeableness, and neuroticism (common acronyms are OCEAN, NEOAC, or CANOE). Conscientiousness is exemplified by being disciplined, organized, achievement-oriented, and dependable. Neuroticism refers to degree of emotional stability, impulse control, aggressiveness and anxiety. Extraversion is displayed through a higher degree of sociability, assertiveness, and talkativeness. Openness is reflected in a strong intellectual curiosity, creativity and a preference for novelty and variety. Finally, agreeableness refers to being helpful, cooperative, and sympathetic towards others. The neuroticism factor is sometimes referred by its low pole – "emotional stability". Some disagreement remains about how to interpret the openness factor, which is sometimes called "intellect" rather than openness to experience. Beneath each factor, a cluster of correlated specific traits are found; for example, extraversion includes such related qualities as gregariousness, assertiveness, excitement seeking, warmth, activity and positive emotions.<sup>[2]</sup>

## The five factors

The factors of the Big Five and their constituent traits can be summarized as (OCEAN):<sup>[3]</sup>

- **Openness to experience** – (inventive/curious vs. consistent/cautious). Appreciation for art, emotion, adventure, unusual ideas, curiosity, and variety of experience.
- **Conscientiousness** – (efficient/organized vs. easy-going/careless). A tendency to show self-discipline, act dutifully, and aim for achievement; planned rather than spontaneous behavior.
- **Extraversion** – (outgoing/energetic vs. solitary/reserved). Energy, positive emotions, surgency, and the tendency to seek stimulation in the company of others.
- **Agreeableness** – (friendly/compassionate vs. cold/unkind). A tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others.
- **Neuroticism** – (sensitive/nervous vs. secure/confident). A tendency to experience unpleasant emotions easily, such as anger, anxiety, depression, or vulnerability.

The Big Five model is a comprehensive, empirical, data-driven research finding.<sup>[4]</sup> Identifying the traits and structure of human personality has been one of the most fundamental goals in all of psychology. The five broad factors were discovered and defined by several independent sets of researchers.<sup>[4]</sup> 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.

The initial model was advanced by Ernest Tupes and Raymond Christal in 1961,<sup>[5]</sup> but failed to reach an academic audience until the 1980s. In 1990, J.M. Digman advanced his five factor model of personality, which Goldberg extended to the highest level of organization.<sup>[6]</sup> These five over-arching domains have been found to contain and subsume most known personality traits and are assumed to represent the basic structure behind all personality traits.<sup>[7]</sup> These five factors provide a rich conceptual framework for integrating all the research findings and theory in personality psychology. The Big Five traits are also referred to as the "**Five Factor Model**" or **FFM**,<sup>[8]</sup> and as the **Global Factors of personality**.<sup>[9]</sup>

At least four sets of researchers have worked independently for decades on this problem and have identified generally the same Big Five factors: Tupes & Cristal were first, followed by Goldberg at the Oregon Research Institute,<sup>[10][11][12][13][14]</sup> Cattell at the University of Illinois,<sup>[15][16][17][18]</sup> and Costa and McCrae at the National

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Institutes of Health.<sup>[19][20][21][22]</sup> 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.<sup>[23][24][25][26][27]</sup>

Because the Big Five traits are broad and comprehensive, they are not nearly as powerful in predicting and explaining actual behavior as are the more numerous lower-level traits. Many studies have confirmed that in predicting actual behavior the more numerous facet or primary level traits are far more effective (e.g. Mershon & Gorsuch, 1988;<sup>[28]</sup> Paunonon & Ashton, 2001<sup>[29]</sup>)

When scored for individual feedback, these traits are frequently presented as percentile scores. For example, a Conscientiousness rating in the 80th percentile indicates a relatively strong sense of responsibility and orderliness, whereas an Extraversion rating in the 5th percentile indicates an exceptional need for solitude and quiet. Although these trait clusters are statistical aggregates, exceptions may exist on individual personality profiles. On average, people who register high in Openness are intellectually curious, open to emotion, interested in art, and willing to try new things. 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.

The most frequently used measures of the Big Five comprise either items that are self-descriptive sentences<sup>[30]</sup> or, in the case of lexical measures, items that are single adjectives.<sup>[31]</sup> 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*<sup>[32]</sup> or a very brief (10 item) measure of the Big Five domains.<sup>[33]</sup>

## 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, appreciative of art, and sensitive to beauty. They tend to be, when compared to closed people, more creative and more aware of their feelings. They are more likely to hold unconventional beliefs. 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.<sup>[34]</sup>

### Sample openness 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 spend time reflecting on things.
- 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*)<sup>[35]</sup>

## Conscientiousness

**Conscientiousness** is a tendency to show self-discipline, act dutifully, and aim for achievement against measures or outside expectations. The trait shows a preference for planned rather than spontaneous behavior. It influences the way in which we control, regulate, and direct our impulses. According to a study conducted at Michigan State University, it was found by R.E. Lucas and his colleagues that the average level of conscientiousness augmented among young adults and then declined among older adults.<sup>[36]</sup>

### Sample conscientiousness 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*)<sup>[35]</sup>

## Extraversion

**Extraversion** is characterized by positive emotions, surgency, and the tendency to seek out stimulation and the company of others. The trait is marked by pronounced engagement with the external world. Extraverts enjoy being with people, and are often perceived as full of energy. They tend to be enthusiastic, action-oriented individuals who are likely to say "Yes!" or "Let's go!" to opportunities for excitement. In groups they like to talk, assert themselves, and draw attention to themselves.

Introverts have lower social engagement and activity 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. Introverts simply need less stimulation than extraverts and more time alone. They may be very active and energetic, simply not socially.

### Sample extraversion 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 keep in the background. (*reversed*)
- I have little to say. (*reversed*)
- I don't like to draw attention to myself. (*reversed*)
- I am quiet around strangers. (*reversed*)<sup>[35]</sup>

## Agreeableness

**Agreeableness** is a tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others. The trait reflects individual differences in general concern for social harmony. Agreeable individuals value getting along with others. They are generally considerate, friendly, generous, helpful, and willing to compromise their interests with others. Agreeable people also have an optimistic view of human nature.

Although agreeableness is positively correlated with good team work skills, it is negatively correlated with leadership skills. Those who voice out their opinion in a team environment tend to move up the corporate rankings, whereas the ones that don't, remains in the same position, usually labelled as the followers of the team.<sup>[37]</sup>

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.

### Sample agreeableness 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*)<sup>[35]</sup>

## Neuroticism

**Neuroticism** is the tendency to experience negative emotions, such as anger, anxiety, or depression. 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.<sup>[38]</sup> 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. 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 to high Neuroticism scores and increase a person's likelihood of falling into clinical depression.<sup>[39]</sup>

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.

Research suggest, extraversion and neuroticism are negatively correlated.<sup>[38]</sup>

### Sample neuroticism 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 often feel blue.
- I worry about things.
- I am relaxed most of the time. (*reversed*)
- I seldom feel blue. (*reversed*)<sup>[35]</sup>

## History

### Early trait research

The first major inquiry into the lexical hypothesis was made by Sir Francis Galton.<sup>[40]</sup> This is the idea that the most salient and socially relevant personality differences in people's lives will eventually become encoded into language. The hypothesis further suggests that by sampling language, it is possible to derive a comprehensive taxonomy of human personality traits.

In 1936, Gordon Allport and H. S. Odbert put this hypothesis into practice.<sup>[41]</sup> They worked through two of the most comprehensive dictionaries of the English language available at the time and extracted 17,953 personality-describing words. They then reduced this gigantic list to 4,504 adjectives which they believed were descriptive of observable and relatively permanent traits.

Raymond Cattell obtained the Allport-Odbert list in the 1940s, added terms obtained from psychological research, and then eliminated synonyms to reduce the total to 171.<sup>[15]</sup> He then asked subjects to rate people whom they knew by the adjectives on the list and analyzed their ratings. Cattell identified 35 major clusters of personality traits which he referred to as the "personality sphere." He and his associates then constructed personality tests for these traits. The data they obtained from these tests were analyzed with the emerging technology of computers combined with the statistical method of factor analysis. This resulted in sixteen major personality factors, which led to the development of the 16PF Personality Questionnaire.

In 1961, two United States Air Force researchers, Ernest Tupes and Raymond Christal, analyzed personality data from eight large samples. Using Cattell's trait measures, they found five recurring factors, which they named "Surgency", "Agreeableness", "Dependability", "Emotional Stability", and "Culture".<sup>[42]</sup> This work was replicated by Warren Norman, who also found that five major factors were sufficient to account for a large set of personality data. Norman named these factors Surgency, Agreeableness, Conscientiousness, Emotional Stability, and Culture.<sup>[43]</sup> Raymond Cattell viewed these developments as an attack on his 16PF model and never agreed with the growing Five Factor consensus. He refers to "...the five factor heresy" which he considers "...is partly directed against the 16PF test". Responding to Goldberg's article in the *American Psychologist*, 'The Structure of Phenotypic Personality Traits', Cattell stated, "No experienced factorist could agree with Dr Goldberg's enthusiasm for the five factor personality theory". This determined rejection of the FFM challenge to his 16 factor model is presented in an article published towards the end of his life and entitled 'The fallacy of five factors in the personality sphere', Cattell, R. B. (1995), *The Psychologist, The British Psychological Society*, May Issue pp 207–208.

## 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 tests 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 by personality tests was considered to be impossible.

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. As a result correlations between personality and behavior increased substantially, and it was clear that “personality” did in fact exist. Personality and social psychologists now generally agree that both personal and situational variables are needed to account for human behavior. Trait theories became justified, and there was a resurgence of interest in this area.

By 1980, the pioneering research by Tupes, Christal, and Norman had been largely forgotten by psychologists. Lewis Goldberg started his own lexical project, independently found the five factors once again, and gradually brought them back to the attention of psychologists.<sup>[44]</sup> He later coined the term "Big Five" as a label for the factors.

## Validity of the Big Five

In a 1981 symposium in Honolulu, four prominent researchers, Lewis Goldberg, Naomi Takemoto-Chock, Andrew Comrey, and John M. Digman, reviewed the available personality tests of the day. They concluded that the tests which held the most promise measured a subset of five common factors, just as Norman had discovered in 1963. This event was followed by widespread acceptance of the five factor model among personality researchers during the 1980s. 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.

## Selected scientific findings

Ever since the 1990s when the consensus of psychologists gradually came to support the Big Five, there has been a growing body of research surrounding these personality traits (see for instance, Robert Hogan's edited book "Handbook of Personality Psychology" (Academic Press, 1997)).

## Heritability

All five factors show an influence from both heredity and environment. Studies of twins suggest that these effects contribute in roughly equal proportion.<sup>[45]</sup> Of four recent twin studies, the mean estimated broad heritabilities on self-report measures for the Big Five traits were as follows:<sup>[46]</sup>

Domain	Heritability
Openness to experience	57%
Extraversion	54%
Conscientiousness	49%
Neuroticism	48%
Agreeableness	42%

## Learning styles

Similar to personality, individual learning styles play an important role in Big Five traits as well. Scientists have defined four types of learning styles, which are synthesis analysis, methodical study, fact retention, and elaborative processing. The main functions of these four learning styles are as follow:

Name	Function
Synthesis analysis	processing information, forming categories, and organizing them into hierarchies
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

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.<sup>[47]</sup>

Recent studies suggest that personality traits and learning styles can predict performance of an individual in school and their academic achievements. 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. Further research in identifying the connections between personality, learning styles, and academic achievement can help instructors employ effective techniques which can result in greater student interest leading to high academic achievement.<sup>[48]</sup>

## Development

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.<sup>[49]</sup> 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.<sup>[50]</sup> 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.<sup>[51]</sup> In addition to these group effects, there are individual differences: different people demonstrate unique patterns of change at all stages of life.<sup>[52]</sup>

## Gender differences

Cross-cultural research has shown some patterns of gender differences on responses to the Big Five Inventory. For example, women consistently report higher Neuroticism and Agreeableness, and men often report higher extraversion and conscientiousness. Gender differences in personality traits are largest in prosperous, healthy, and egalitarian cultures in which women have more opportunities that are equal to those of men. Both men and women tend to grow more extraverted and conscientious and less neurotic and agreeable as cultures grow more prosperous and egalitarian, but the effect is stronger for men.<sup>[53][54]</sup>

## Birth order

The suggestion has often been made that individuals differ by the order of their births. Frank Sulloway argues that birth order is correlated with personality traits. He claims that firstborns are more conscientious, more socially dominant, less agreeable, and less open to new ideas compared to laterborns.

However, Sulloway's case has been called into question. One criticism is that his data confounds family size with birth order. Subsequent analyses have shown that birth order effects are only found in studies where the subjects' personality traits are rated by family members (such as siblings or parents) or by acquaintances familiar with the subjects' birth order. Large scale studies using random samples and self-report personality tests like the NEO PI-R have found milder effects than Sulloway claimed, or no significant effects of birth order on personality.<sup>[55][56]</sup>

## Cross-cultural research

As an imposed etic measure,<sup>[57]</sup> the Big Five have been replicated in a variety of different languages and cultures, such as German,<sup>[58]</sup> Chinese,<sup>[59]</sup> Indian,<sup>[60]</sup> etc.<sup>[61]</sup> For example, Thompson has demonstrated the Big Five structure across several cultures using an international English language scale.<sup>[32]</sup>

Support has been less good for the Big Five as an emic measure in Asian countries. Cheung, van de Vijver, and Leong (2011) suggest that the Openness factor is particularly unsupported and that a different fifth factor is sometimes identified.

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.<sup>[62]</sup> For instance, the degree to which a country values individualism correlates with its average Extraversion, while people living in cultures which are accepting of large inequalities in their power structures tend to score somewhat higher on Conscientiousness. The reasons for these differences are as yet unknown; this is an active area of research.

## Non-humans

The big five personality factors 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 did not replicate in a new zoo sample or to other settings (perhaps reflecting the design of the CPQ).<sup>[63]</sup>

## Various applications

The Big-Five Inventory can be administered by employers to job applicants. It is believed that the Big-Five traits are predictive of future performance outcomes. Job outcome measures include: job and training proficiency and personnel data.<sup>[64]</sup>

There have also 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.<sup>[65]</sup>

Some businesses, organizations, and interviewees assess individuals based on their 5 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).<sup>[66]</sup> Further studies have linked professional burnout with neuroticism, while linking extraversion to enduring positive work experience.<sup>[67]</sup> 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. It is possible that these individuals are too passive and do not aspire to obtain higher levels of income.<sup>[68]</sup>



Studies have utilized big-five personality inventory in college students to determine that hope, which is linked to agreeableness has a positive effect of psychological well being. Individuals high in neurotic tendencies are less likely to display hopeful tendencies and are negatively associated with well-being.<sup>[69]</sup> 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.<sup>[70]</sup>

## Criticisms

Much research has been conducted on the Big Five. This has resulted in both criticism<sup>[71]</sup> and support<sup>[72]</sup> for the model. Critics argue that there are limitations to the scope of Big Five as an explanatory or predictive theory. It is argued that the Big Five does not explain all of human personality. The methodology used to identify the dimensional structure of personality traits, factor analysis, is often challenged for not having a universally-recognized basis for choosing among solutions with different numbers of factors. Another frequent criticism is that the Big Five is not theory-driven. It is merely a data-driven investigation of certain descriptors that tend to cluster together under factor analysis.

### 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, Manipulativeness/Machiavellianism, Honesty, Self-Awareness, Thriftiness, Conservativeness, Critical Judgement, Masculinity/Femininity, Snobbishness, Sense of humour, Narcissism, Identity, Self-concept, and Motivation.<sup>[73]</sup> Correlations have been found between some of these variables and the Big Five, such as the inverse relationship between political conservatism and Openness;<sup>[74]</sup> although variation in these traits is not well explained by the Five Factors themselves. 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.<sup>[75]</sup>

In many studies, the five factors are not fully orthogonal to one another; that is, the five factors are not independent. Negative correlations often appear between Neuroticism and Extraversion, for instance, indicating that those who are more prone to experiencing negative emotions tend to be less talkative and outgoing. 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

The methodology used to identify the dimensional structure of personality traits, factor analysis, is often challenged for not having a universally recognized basis for choosing among solutions with different numbers of factors. That is, 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.

A methodological criticism often directed at the Big Five is that much of the evidence relies on self report questionnaires; self-report bias and falsification of responses are difficult to deal with and account for. 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. The five factor structure has been replicated in peer reports.<sup>[76]</sup> However, many of the substantive findings rely on self-reports.

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.<sup>[77]</sup>

### 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. While this does not mean that these five factors don't exist, the underlying causes behind them are unknown. Sensation seeking and cheerfulness are not linked to Extraversion because of an underlying theory; this relationship is an empirical finding to be explained.

Jack Block's final published work before his death in January 2010 drew together his lifetime perspective on the five factor model.<sup>[78]</sup>

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 various 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 five may promise deeper biological understanding of the origins and implications of these superfactors.

### Further research

Current research concentrates on a number of areas. One important question is: are the five factors the right ones? 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 don't appear to have a single Agreeableness factor.<sup>[79]</sup> Other researchers find evidence for Agreeableness but not for other factors.<sup>[30]</sup>

In an attempt to explain variance in personality traits more fully, some have found seven factors,<sup>[80]</sup> some eighteen,<sup>[81]</sup> and some only three.<sup>[82]</sup> What determines the eventual number of factors is essentially the kind of information that is put into the factor analysis in the first place (i.e. the "Garbage in, Garbage out" principle). Since theory often implicitly precedes empirical science (such as factor analysis), the Big Five and other proposed factor structures should always be judged according to the items that went into the factor analytic algorithm. Recent studies show that seven- or eighteen-factor models have their relative strengths and weaknesses in explaining variance in DSM-based symptom counts in nonclinical samples<sup>[83]</sup> and in psychiatric patients.<sup>[84]</sup> and do not seem to be clearly outperformed by the Big Five.

A validation study, in 1992, conducted by Paul Sinclair and Steve Barrow, involved 202 Branch Managers from the then TSB Bank. It found several significant correlations with job performance across 3 of the Big Five scales. The correlations ranged from .21 – .33 and were noted across 3 scales: High Extraversion, Low Neuroticism and High Openness to Experience.<sup>[85]</sup>

Another area of investigation is to make a more complete model of personality. The "Big Five" personality traits are empirical observations, not a theory; the observations of personality research remain to be explained. Costa and McCrae have built what they call the Five Factor Theory of Personality as an attempt to explain personality from the cradle to the grave. They don't follow the lexical hypothesis, though, but favor a theory-driven approach inspired by the same sources as the sources of the Big Five.

Another area of investigation is the downward extension of Big Five theory, or the Five Factor Model, into childhood. Studies have found Big Five personality traits to correlate with children's social and emotional adjustment and academic achievement. More recently, the Five Factor Personality Inventory – Children<sup>[86]</sup> was published extending assessment between the ages of 9 and 18. Perhaps the reason for this recent publication was the controversy over the application of the Five Factor Model to children. Studies by Oliver P. John et al. with adolescent boys brought two new factors to the table: "Irritability" and "Activity". In studies of Dutch children, those same two new factors also became apparent. These new additions "suggest that the structure of personality traits may be more differentiated in childhood than in adulthood",<sup>[87]</sup> which would explain the recent research in this particular area.

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:

[88]

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.<sup>[89]</sup>

An individual interested in obtaining some knowledge on the levels of their own big five traits may be applied in self-surveys. There are various internet sites that may give a curious person an idea about their personality type.<sup>[90]</sup>

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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.
  - Big Five Personality Test (<http://personality-testing.info/tests/BIG5.php>) using items from the IPIP.
- Selection from the "Handbook of personality: Theory and research" (<http://www.ocf.berkeley.edu/~johnlab/bigfive.htm>) for researchers

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