Feist, J. & Feist G. (2021). Theories of Personality (10th Edition). New York: McGraw Hill.

Chapter13
McCrae and Costa's Five-Factor Trait Theory

Learning Objectives

After reading this chapter, students should be able to accomplish the following objectives:

1. Explain the basics of factor analytic procedures.
2. Explain the importance of R. B. Cattell's pioneering work.
3. Distinguish between the Big Five as a taxonomy and as a theory.
4. List and briefly describe each of the Big Five factors.
5. Discuss the evolution of the Five-Factor Theory.
6. List and briefly describe McCrae and Costa's three core components of personality.
7. List and briefly describe McCrae and Costa's three peripheral components of personality.
8. Briefly describe some of the cross-cultural research on McCrae and Costa's Big Five factors.
9. Critique the pros and cons of McCrae and Costa's factor and trait theories.
10. Discuss the relationship of parsimony to factor and trait theories.

Lecture Outline

I. Overview of Trait and Factor Theories

Presently, most researchers who study personality traits agree that five, and only five, and no fewer than five dominant traits continue to emerge from factor analytic techniques—mathematical procedures capable of sifting personality traits from mountains of test data.

Whereas many contemporary theorists believe that five is the magic number, earlier theorists such as Raymond B. Cattell found many more personality traits, and Hans J. Eysenck insisted that only three major factors can be discerned by a factor analytic approach. In addition, Gordon Allport's commonsense approach yielded 5–10 traits that are central to each person's life. The Five-Factor Theory (often called the Big Five) includes neuroticism and extraversion; but it adds openness to experience, agreeableness, and conscientiousness.

II. The Pioneering Work of Raymond B. Cattell

Because some familiarity with Cattell's trait theory enhances the understanding of McCrae and Costa's five-factor theory, Cattell's work is discussed and compared with that of McCrae and Costa.

First, both Cattell and McCrae and Costa used an **inductive method** of gathering data; that is, they began with no preconceived bias concerning the number or name of traits or types. Other factor theorists, however, have used the **deductive method**; that is, they have preconceived hypotheses in mind before they begin to collect data.

Second, Cattell used three different media of observation to examine people from as many angles as possible. Third, Cattell divided traits into *common traits* (shared by many) and *unique traits* (peculiar to one individual). He also distinguished *source traits* from trait indicators, or *surface traits*. Cattell further classified traits into *temperament*, *motivation*, and *ability*. Traits of temperament are concerned with *how* a person behaves, motivation deals with *why* one behaves, and ability refers to *how far* or *how fast* one can perform.

Fourth, Cattell's multifaceted approach yielded 35 primary, or first-order, traits, which measure mostly the temperament dimension of personality. Of these factors, 23 characterize the normal population and 12 measure the pathological dimension. The largest and most frequently studied of the normal traits are the 16 personality factors found on Cattell's (1949) Sixteen Personality Factors Questionnaire (16 PF Scale).

III. Basics of Factor Analysis

A comprehensive knowledge of the mathematical operations involved in **factor analysis** is not essential to an understanding of trait and factor theories of personality, but a general description of this technique should be helpful.

To use factor analysis, one begins by making specific observations of many individuals. These observations are then quantified in some manner; for example, height is measured in inches, weight in pounds, aptitude in test scores, job performance by rating scales, and so on. The next step is to determine which of these variables (scores) are related to which other variables and to what extent. To do this, calculate the **correlation coefficient** between each variable and each of the other 999 scores. (A correlation coefficient is a mathematical procedure for expressing the degree of correspondence between two sets of scores.)

With 1,000 separate variables, the table of intercorrelations would be quite cumbersome. At this point, one may turn to *factor analysis*, which can account for a large number of variables with a smaller number of more basic dimensions. These more basic dimensions can be called *traits*, that is, factors that represent a cluster of closely related variables. One can identify a number of other **factors**, or units of personality derived through factor analysis. The number of factors, of course, will be smaller than the original number of observations.

The next step is to determine the extent to which each individual score contributes to the various factors. Correlations of scores with factors are called **factor loadings**. Traits generated through factor analysis may be either **unipolar traits** (scaled from zero to some large amount) or **bipolar traits** (extend from one pole to an opposite pole, with zero representing a midpoint). Introversion versus extraversion, liberalism versus conservatism,

and social ascendancy versus timidity are examples of bipolar traits.

In order for mathematically derived factors to have psychological meaning, the axes on which the scores are plotted are usually turned or *rotated* into a specific mathematical relationship with each other. This rotation can be either orthogonal or oblique, but advocates of the Five-Factor Theory favor the **orthogonal rotation**. The **oblique method**, which was advocated by Cattell, assumes some positive or negative correlation and refers to an angle of less than or more than 90°. Psychologically, orthogonal rotation usually results in only a few meaningful traits, whereas oblique methods ordinarily produce a larger number.

IV. The Big Five: Taxonomy or Theory?

McCrae and Costa's Five-Factor Model (FFM) began as an attempt to identify basic personality traits as revealed by factor analysis. This work soon evolved into a taxonomy and the Five-Factor *Model.* After much additional work, this model became a theory, one that can both *predict* and *explain* behavior.

V. Biographies of Robert R. McCrae and Paul T. Costa, Jr.

Robert Roger McCrae was born on April 28, 1949, in Maryville, Missouri, the youngest of three children. After completing an undergraduate degree in philosophy from Michigan State University, he earned a PhD in psychology from Boston University. Following the lead of Raymond Cattell, he began using factor analysis as a means of measuring the structure of human traits. After completing his academic work, McCrae began working with Paul Costa at the National Institute of Health.

Paul T. Costa, Jr. was born on September 16, 1942, in Franklin, New Hampshire. He earned his undergraduate degree in psychology at Clark University and both his master's (1968) and PhD (1970) in human development from the University of Chicago. In 1978, he began working with Robert McCrae at the National Institute of Aging's Gerontology Research Center, where he continues to conduct research on human development and aging. The collaboration between Costa and McCrae has been unusually fruitful, with well over 200 coauthored research articles and chapters, and several books.

VI. In Search of the Big Five

In the late 1970s and early 1980s, Costa and McCrae, like most other factor researchers, were building elaborate taxonomies of personality traits, but they were not using these classifications to generate testable hypotheses. Instead, they were simply using factor analytic techniques to examine the stability and structure of personality. As with many other factor theorists, they quickly discovered the traits of extraversion (E), neuroticism (N), and openness to experience (O).

A. Five Factors Found

As late as 1983, McCrae and Costa were arguing for a three-factor model of personality, but by 1985 they begin to report work on the five factors of personality, having added agreeableness (A) and conscientiousness (C). Costa and McCrae (1992) did not fully develop the A and C scales until the revised NEO-PI appeared in 1992. The five factors have been found across a variety of cultures, using a plethora of languages (McCrae & Allik, 2002). In addition, the five factors show some permanence with age; that is, adults—in the absence of catastrophic illness such as Alzheimer's—tend to maintain the same personality structure as they grow older (McCrae & Costa, 2003).

B. Description of the Five Factors

McCrae and Costa agreed with Eysenck that personality traits are bipolar and follow a bell-shaped distribution. That is, most people score near the middle of each trait, with only a few people scoring at the extremes. For example, people who score high on *neuroticism* tend to be anxious, temperamental, self-pitying, self-conscious, emotional, and vulnerable to stress-related disorders, whereas people with low scores on *neuroticism* are usually calm, even-tempered, self-satisfied, and unemotional. People who score high on *extraversion* tend to be affectionate, jovial, talkative, joiners, and fun-loving, whereas low extraversion scorers are likely to be reserved, quiet, loners, passive, and lacking the ability to express strong emotion. High openness to experience scorers prefer variety in their life and are contrasted to low openness to experience scorers who have a need for closure and who gain comfort in their association with familiar people and things. People who score high in the direction of agreeableness tend to be trusting, generous, yielding, acceptant, and good-natured. Low direction of agreeableness scorers are generally suspicious, stingy, unfriendly, irritable, and critical of other people. Finally, people high on the *conscientiousness* scale tend to be ordered, controlled, organized, ambitious, achievement focused, and self-disciplined. People who score low on conscientiousness tend to be disorganized, negligent, lazy, and aimless and are likely to give up when a project becomes difficult.

VII. Evolution of the Five-Factor Theory

Originally, the five factors constituted nothing more than a taxonomy, a classification of basic personality traits. By the late 1980s, Costa and McCrae became confident that they and other researchers had found a stable structure of personality. For 25 years, Costa and McCrae had been at the forefront of contemporary personality research, developing and elaborating on the Five-Factor Model. According to McCrae and Costa (1999), "neither the model itself nor the body of research findings with which it is associated constitutes a theory of personality. A theory organizes findings to tell a coherent story, to bring into focus those issues and phenomena that can and should be explained" (pp. 139–140). Earlier, McCrae and Costa (1996, p. 78) had stated that "the facts about personality are beginning to fall into place. Now is the time to begin to make sense of them." In other words, it was time to turn the Five-Factor Model (taxonomy) into a Five-Factor Theory (FFT).

A. Units of the Five-Factor Theory

In the personality theory of McCrae and Costa (1996, 1999, 2003; McCrae & Sutin, 2018), behavior is predicted by an understanding of two central or core components and three peripheral ones. The two core components are as follows:

- basic tendencies and
- characteristic adaptations (including self-concept).

The three peripheral units of the model are as follows:

- biological bases;
- objective biography; and
- external influences.

In Figure 13.3, the central or core components are represented by rectangles, whereas the peripheral components are represented by ellipses. The arrows represent **dynamic processes** and indicate the direction of causal influence. As defined by McCrae and Costa (1996), **basic tendencies** are one of the central components of personality. Core components of Five-Factor Theory include the **characteristic adaptations**, that is, acquired personality structures that develop as people adapt to their environment and include habits, skills, and beliefs (McCrae & Sutin, 2018). McCrae and Costa (2003) explain that **self-concept** refers to knowledge and attitudes about oneself.

The principal biological mechanisms that influence basic tendencies are genes, hormones, and brain structures. The second peripheral component is **objective biography**, defined as "everything the person does, thinks, or feels across the whole life span" (McCrae & Costa, 2003, p. 187). The question of how people respond to the opportunities and demands of the context is what **external influences** is all about.

B. Basic Postulates

The two most important core postulates are basic tendencies and characteristic adaptations. Basic tendencies have four postulates: individuality, origin, development, and structure. The *individuality* postulate stipulates that adults have a unique set of traits and that each person exhibits a unique combination of trait patterns. The *origin* postulate takes a clear if somewhat controversial stance: All personality traits are the result solely of endogenous (internal) forces, such as genetics, hormones, and brain structures. The *development* postulate assumes that traits develop and change through childhood, but in adolescence their development slows, and by early to mid-adulthood (roughly age 30), change in personality nearly stops altogether (Costa & McCrae, 1994; Costa, McCrae, & Arenberg, 1980). The *structure* postulate states that traits are organized hierarchically from narrow and specific to broad and general just as Eysenck (1990) had suggested.

The postulate concerning characteristic adaptations states that, over time, people adapt to their environment "by acquiring patterns of thoughts, feelings, and behaviors that are consistent with their personality traits and earlier adaptations" (McCrae & Costa, 2003, p. 190). The second characteristic adaptation postulate—maladjustment—suggests that our responses are not always consistent with personal goals or cultural values. The third characteristic adaptation postulate states that basic traits may "change over time in response to biological maturation, changes in the environment, or deliberate interventions" (McCrae & Costa, 2003, p. 190).

VIII. Related Research

The five trait theory of McCrae and Costa has drawn a considerable amount of research and is very popular in the field of personality. Costa and McCrae have developed a widely used personality inventory: the NEO-PI (Costa & McCrae, 1985, 1992).

Traits have been linked to vital outcomes such as physical health (Martin, Friedman, & Schwartz, 2007), well-being (Costa & McCrae, 1980), and academic success (Noftle & Robins, 2007; Zyphur, Islam, & Landis, 2007), but traits have also been linked to more common, everyday outcomes such as mood (McNiel & Fleeson, 2006).

A. Consistency and Change of Personality Over the Lifetime

Although personality shows considerable stability over one's lifetime, it also changes and develops between our infant and adult years. McCrae and Costa have emphasized stability over change, and yet there is evidence for both.

No one is consistent all of the time or in all situations. Consistency is a matter of degree. Longitudinal studies, those that examine the same people over a period of time, reveal high levels of stability of personality traits. Research from behavior genetics has demonstrated that personality stability between adolescence and adulthood is largely due to genetic factors (Blonigen et al., 2006; Gillespie et al., 2003; Krueger & Johnson, 2008; Takahashi et al., 2007).

Willful and intentional change of personality appears to be difficult. Most change in personality comes about by change in life circumstance or brain functioning. Recent research confirms that some degree of change in personality occurs normally from adolescence to adulthood and into old age (Allemand, Zimprich, & Hendriks, 2008; Josefsson et al., 2013; Letzring, Edmonds, & Hampson, 2014; Lodi-Smith et al., 2009; Roberts & Mroczek, 2008). Some of the most impressive evidence of personality change comes from a meta-analysis of 92 studies that assessed personality over the lifetime in over 50,000 individuals on the Big Five dimensions of personality (Roberts, Walton, & Viechtbauer, 2006). In general, people become steadily more agreeable and conscientious from adolescence to late adulthood and tend to become more assertive or dominant and emotionally stable from adolescence to middle adulthood and then level off on these

personality dimensions. People generally become more sociable (social vitality) and open to new experiences from adolescence to early adulthood. These traits level off in adulthood and then decline in older adulthood.

B. Measuring the Big Five With Our Digital Footprints

More recently, the part of the Internet that has profoundly changed how people interact, communicate, think, and behave is social media, particularly Facebook, Twitter, Instagram, and Snapchat. The so-called "digital footprint" people leave behind on these social media sites includes their likes, views, musical preferences, shares, tweets, and so on.

How well does these digital footprints reflect and match one's personality traits? One way to answer this question is to first determine whether digital footprints predict one's personality traits. The answer is yes. Current research also suggests that social media footprint is not only an adequate measure of personality, but in fact it may in some ways be even better than traditional measures like human-completed questionnaires. A study by Hinds and Joinson (2019) found that digital footprint records were more accurate than ratings by friends, family, and colleagues—with accuracy being calculated as the correlation between observers or digital footprint with self-ratings of personality. Also, how one uses social media is partly impacted by one's personality. For instance, people high in agreeableness receive more "likes" and "comments" on their Facebook profile pictures than less agreeable people.

IX. Critique of Trait and Factor Theories

Like other theories, trait and factor theories must be judged by six criteria of a useful theory. First, do trait and factor theories *generate research?* On this criterion, the Five-Factor Model of Costa and McCrae must be rated very high. The trait theory of McCrae and Costa and other advocates of the Big Five personality structure have also generated large amounts of **empirical** research. Second, are trait and factor theories *falsifiable?* On this criterion, trait and factor theories receive a moderate to high rating.

Third, trait and factor theories are rated high on their ability to *organize knowledge.* Anything that is truly known about personality should be reducible to some quantity. Fourth, a useful theory has the power to *guide the actions of practitioners,* and on this criterion, trait and factor theories receive mixed reviews. Are trait and factor theories *internally consistent?* The Big Five theory and research is internally quite consistent, even if there are some (e.g., Eysenck, see next chapter) who disagree with the number of basic dimensions of personality. The final criterion of a useful theory is *parsimony.* Ideally, trait and factor theories should receive an excellent rating on this standard, because factor analysis is predicated on the idea of the fewest explanatory factors possible.

X. Concept of Humanity

The Five-Factor theorists were not concerned with traditional themes such as determinism versus free choice, optimism versus pessimism, and teleological versus causal influences. First, factor analysts see humans as being different from other animals. Only humans have the ability to report data about themselves. From this fact, it can be inferred that McCrae and Costa believed that humans possess not only *consciousness* but also self-consciousness. Second, McCrae and Costa placed emphasis on *genetic factors* of personality. They believe that traits and factors are both inherited and have strong genetic and biological components and hence are universal. Trait theories are more concerned with individual differences than with similarities among people.