Dominant Theories: Biological & Trait – Week 2

Direct Genetic Effects

- In the middle of the nineteenth century, Charles Darwin turned the life sciences upside down by arguing that people evolved directly from more primitive species. We are cousins of chimps and apes. This idea was so radical that Darwin spent much effort arguing points such as the similarity of human bones, nerves, and muscles to those of other primates. Such close anatomical relations were not accepted at the time.

Natural Selection and Functionalism

- Darwin points out that each person is different from every other person. Some of these differentiating characteristics help the individual survive – that is, reproduce and pass on her or his genes to offspring. The process by which certain adaptive individual characteristics emerge over generations is known as *natural selection*. For example, in a dangerous situation full of predators, those individuals who are large or tough or fast or smart or able to organise defences are most likely to survive. In a Darwinian analysis, attention is thus drawn to the *function* of a characteristic (such as speed or intelligence or sociability) in survival.
- But which characteristic is the most important? In the predatory environment, was it the speed or the intelligence of the individual, or organisational abilities, or camouflage techniques that made the difference to survival? Or perhaps it was something else altogether? This is a major difficulty with developing the details of a Darwinian approach: it is hard to know what were the precise selection pressures that shaped human evolution over millions of years. This problem plagues the modern application of Darwin's ideas to individual differences – sometimes called *evolutionary personality theory*.
- Individual differences and motivations are seen as due to either alternative strategies or to random variation, but it is difficult to determine the precise causes. Still, it is clear that many of our individual tendencies are "in our bones" or, more accurately, in our genes.
- Can you imagine an excessively happy child, one who is always filled with glee and good humour? In fact, such a condition is one of the signs of a rare genetic disorder called *Angelman syndrome*. Such children are usually also especially attractive and friendly. Unfortunately, they also suffer mental retardation, sleep very little, and walk with a jerky movement, sort of like a puppet.

Angelman Syndrome

- Angelman syndrome is a biological disorder caused by a defect on chromosome 15.
- Another example is Williams syndrome, a rare disorder characterised by physical and developmental problems including an excessively social personality, as well as limited spatial skills and intellectual ability. Persons with Williams syndrome, who are missing about two dozen genes on chromosome 7, love music and are about the friendliest and most sociable people you can meet. Extreme cases like these syndromes demonstrate that genetic factors can dramatically influence personality. Although genes *can* dramatically influence personality in unusual cases, questions remain about the *extent* to which genes affect personality in normal development and *which* aspects they shape.

Behavioural Genomics

- The human genome is the complete set of genes, located on the 23 pairs of chromosomes, that define the biological human being. In the year 2000, the human genome was mostly "unravelled", in the sense that the genes were mapped; that is, genes were marked on the DNA strands. The functions or roles of each gene are far from understood, but this genetic map

holds the potential for better understanding personality by discovering the biological instructions given by each of our genes. The study of how genes affect behaviour is called *behavioural genomics*.

- More traditionally, the field called behavioural genetics has endeavoured to understand how individual differences in biology can affect behaviour. Some of these studies analyse twins adopted or separated at birth to compare nature and nurture (sometimes called "quantitative genetics"). Other studies examined the products and correlates of a specific gene (sometimes called "molecular genetics"). Now, however, with behavioural genomics, we can begin to examine the complex matter of how our genes, evolved from variation and natural selection, function together with each other and the environment to influence behaviour. This examination reveals fascinating insights into what it means to be a person. It also raises many important ethical issues.
- It is easy to assume that a strong sex drive has survival value; individuals with no interest in sexual relations are usually unlikely to pass their genes on to offspring. Yet people vary markedly in their sex drives (libidos). It is also probably safe to assume that love and fear and anger have a genetic basis. They are universal and eternal. Unfortunately, this knowledge does not help us much in explaining the variations from person to person. To do that, we have to find stable individual differences in biological responsiveness.

Gray's Reinforcement Sensitivity Theory

- An extension of the physiological, brain-based model of personality to incorporate findings from modern neuroscience comes from Jeffrey Gray and colleagues. This approach again begins with Pavlov's classic notion that animals' nervous systems have evolved to orient them to attractions and dangers, but also emphasises the notion of the importance of reward or punishment for appropriate/inappropriate behaviours; observation *and* learning are key to survival.
- This approach therefore postulates two relevant biological systems. The first is the *behavioural inhibition system (BIS)*. This system provides the orienting response to novel situations and also responds to things that are punishing. If this system is sensitive, then you are prone to anxiety, always alert and worrying that something bad will happen. Second, there is the *behavioural activation system* (sometimes called the *behavioural approach system*, or *BAS*), which regulates our response to rewards. It is how we learn to enjoy rewarding activities like good food and friends. If this physiological system is overly active, then you are impulsive and constantly seeking rewards. There is evidence that persons with an active behavioural approach system are more prone to drug addiction and overeating.
- This conception first the observation that impulsive people are mostly shaped by rewards, whereas anxious, obsessive people are mostly concerned with avoiding unknown situations and punishments. Would you go away on a weekend ski trip with a blind date? A person with an active biological approach system will be pulled by the potential for many rewards. A person controlled by a strong behavioural inhibition system, however, will shy away, worrying about everything from embarrassment to injury to sexually transmitted diseases.

Twins as a Source of Data

- We should be able to detect systematic biological influences on personality by studying twins. Twin research is indeed now one of the most active areas of research in the study of the biological aspects of personality, with many intriguing studies comparing identical twins to fraternal twins. Identical twins share the same genetic makeup (share 100 percent of their DNA), but fraternal twins (who develop from separate fertilised eggs) have a comparable genetic overlap to ordinary brothers and sisters (sharing 50 percent of their DNA). On various key dimensions – including emotional stability, conscientiousness, intelligence, and extroversion – identical twins are indeed more similar than fraternal twins.
- Does this prove a biological basis? Not necessarily, because identical twins may be treated more similarly than fraternal twins. Identical twins look more alike, and their parents may dress them alike, and so on. Or identical twins may consciously try to act more similarly than fraternal twins. For these reasons, it is much more informative to compare twins who have been adopted and raised apart from each other.

Minnesota Twin Study

- Jack and Oskar are identical twins who were separated in infancy but brought together as adults. Oskar was raised in Germany by his Catholic maternal grandmother; Jack was raised outside Europe by his Jewish father. It turns out that these twin brothers share many traits and habits. They are both absentminded, like spicy foods, and most important for our purposes, have a domineering, angry sort of temperament.
- As identical twins, Jack and Oskar have the same genes (i.e., are *monozygotic* – coming from a single zygote or fertilised egg). Given their disparate upbringings, their similarities are likely somehow due to their genetic endowments. No one has a problem with this argument in terms of Jack's and Oskar's striking physical resemblance. But direct genetic control of personality is less easy to swallow.
- These identical twins and others raised apart from each other have been gathered in a study at the University of Minnesota. Such studies have found impressive similarities in personality between people who have the same genetic makeup. These similarities are less than those of identical twins raised together, thus showing the influence of the environmental upbringing. Bu the similarities of identical twins are greater than those of fraternal twins, who have overlapping but not identical genetic makeups.
- The controversy arises as to *why* identical twins have such similar personalities. Is there a gene for being stingy and a gene for being optimistic? Probably not. But, there may very well be patterns of genes that affect our temperaments and our behavioural predispositions – for example, that make us more aggressive or more sensitive and cautious. When these innate tendencies encounter similar environmental pressures, they often result in similar patterns of behaviour – that is, similar personalities. For example, a cautious, unaggressive boy with a body that is sensitive to pain and stimulation may be unlikely to become a football tackle. This is not to say there is a gene for "sports interest", but there likely is a genetic influence on relevant responsiveness. The distinction is important because it implies that given the right circumstances, the cautious, sensitive, unaggressive boy might very well become a star football tackle.
- Along these lines, one study compared monozygotic (identical) and dizygotic (fraternal) twins on a wide range of attitudes and found a "genetic basis" for certain attitudes. This does not at all mean that we inherit a gene for a specific attitude. Another study found that identical twins are more alike in whether they vote in elections than are fraternal twins, but this doesn't mean that there is gene called "tendency to vote". We won't know why such associations emerge until we understand much more about the complex biological bases of human social behaviour and development, and how they are affected by specific environments.
- There is an ongoing search for genes that might underlie certain aggressive or antisocial personalities. For instance, following Galton's example, researchers constructed family trees of a group of aggressive men in the Netherlands. It is thought that a genetic defect prevents manufacture of an enzyme that breaks down certain neurotransmitters (technically a monoamine oxidase polymorphism). When faced with environmental challenge, these men are primed to "go off" – to overreact because their nervous systems are not being properly regulated. Note that if such a link does become firmly established, the gene itself does not directly cause the aggression. Rather, the gene affects an enzyme, which predisposes the body to react in certain ways; the actual reactions are then determined by the environment, learning, and by other aspects of the person. Further, there may be gene-influenced differences in parenting styles, or evoked bad parenting from an aggressive child.
- Part of our personality is "heritable", which means that biologically-based variation plays a role in later patterns of observable behaviour. For example, how much time one is likely to spend watching television depends partly on the social environment and partly on one's complex biological predispositions. That is, personality is partly heritable but not inherited. There are no genes for extraversion or other traits, and there are no genes for IQ or other abilities; but there are consistencies that emerge when certain biologically related individuals are raised in certain environments.

Nurture and Nonshared Environmental Variance

- Children of the same parents who are raised in the same family share both some biological endowment and much environmental influence, yet their personalities are often strikingly different. To some extent, children in the same family have different experiences and are treated differently, but it is difficult to know precisely how and why. Significantly, in moving from childhood to adulthood, the environmental effects on personality become more evident. There is an inverse correlation between personality similarity and age for both monozygotic and dizygotic twins: as twins get older, their personalities become more different.
- In a controversial book *The Nurture Assumption*, author Judith Rich Harris argued that parents matter little but peers (classmates and friends) sometimes matter a lot. Harris began with the evidence that identical twins raised apart have similar personalities. She went on to note that different children raised by the same parents have different personalities; that many children from loving homes turn to drugs or violence; that adoptive children raised by the same parents have different personalities and so on, with more evidence showing the limits of parenting.
- In some ways, this analysis overstates its case. For example, on broader, complex traits (rather than specific biological abilities), children do tend to adopt their parents' religions, styles of interaction, political affiliations, and many attitudes and customs. By pointing out the importance of peers, Harris does, however, illustrate the concept of *nonshared environmental variance*. Nonshared environmental variance includes those features of the environment that children raised in the same home experience differently. Most obviously, the first child in a family experiences the second child as a sibling, whereas the second child has the first child as a sibling. Their family environments thus include different members. But there are many other differences. Each sibling does not live in the other siblings' shoes, and their many minor daily experiences differ. As a child grows older, he or she begins choosing certain environments but is also exposed to more varied situations, and so some aspects of the genetic predispositions become more important while others become less important.
- Getting back to the case of studies of identical twins raised apart, who often show similar personalities, many complex questions arise. Were they placed into similar types of homes by adoption agencies? Did they learn about each other, perhaps through hearing about their twin? Do they try to act similarly upon being brought together, knowing they are twins? Did they tend to seek our similar environments? Perhaps most important, was the process of their similar personality development much more complex than a simple genetic model would assume?

Epigenetics

- We know that behaviour is a result of the interaction of genes and the environment, but advances in molecular biology are improving our appreciation of just what this means. Although our genetic material (DNA) is mostly inherited and fixed, it is activated in different times and ways. The expression of genes – that is the activation or inactivation of relevant parts of the genome – is termed *epigenetics*.
- For example, in times of food deprivation or high stress and trauma, the ways our bodies make proteins can change, producing long-term differences in us, even though our genotype (DNA sequence) has not changed; genes can be turned on or off. This is one reason that even identical twins can show different rates of depression or other mental illnesses that are known to have a genetic basis; the environment can change the expression of genes. An infant genetically prone to be very aggressive or depressed might have his or he genetic predisposition altered by the right upbringing, even right down to the biological level of change. Technological advances in sequencing and analysing the epigenetics of identical twins who differ on personality or disease thus holds great promise for unravelling the precise ways our genes interact with our environments to help shape our personalities.
- So again, how much of personality is genetically determined? No simple answers are expected to be forthcoming in the near future. In fact, the question itself is too simplistic to be helpful in understanding individual differences. Biological predispositions interact with the eliciting circumstances of the environment and the influence of the environments we seek out. Some reviewers estimate that 40 to 50 percent of the variance in personality characteristics is genetically influenced,

but it is hard to understand what this number means (expect in a mathematical sense in an adoptive twins study), since it is well established that biology, socialisation, and environment all are important to personality and behaviour; genes set us on a path, but the ultimate directions we take are then heavily influenced by the people and circumstances we encounter. Further, there is substantial flexibility in the central nervous system, allowing for changes in brain development to occur as a result of environmental (nurture) experiences.

Conclusion: Biological Aspects of Personality

- Do relatively unchangeable biological characteristics such as genetic inheritance, the neuroendocrine system, bodily endowment, and physical health affect personality? Undoubtedly at times they do, and such influences should be carefully studied by the serious student of personality. Gordon Allport wrote decades ago that although psychology is the safest approach to follow in constructing the science of personality, "Someday the 'biological model' may catch up". Today, biology has indeed provided many insights into what it means to be a person. For the most part, these insights concern the outer parameters or limits of human responding.
- Americans like to believe that almost any child who has enough motivation and the proper upbringing can go on to achieve almost anything she or he desires. Success can indeed come from hard work and proper "rearing", but there is also no doubt that biological factors affect a person's characteristic responses. A person is not born a blank slate, to then be written on by the environment; people start with certain inherent predispositions and abilities.
- Charles Darwin turned the life sciences upside down by developing the argument for evolution. In a Darwinian analysis, attention is drawn to the *function* of a characteristic (such as speed or aggressiveness or intelligence) in survival. A prime difficulty of a Darwinian approach is that it is hard to know precisely which selection pressures worked to shape human evolution over millions of years. This problem plagues the modern application of Darwin's ideas – the field of evolutionary personality theory.
- The term *temperament* is used to refer to stable individual differences in emotional reactivity. Four dimensions of temperament are usually isolated: (1) an activity dimension, (2) an emotionality dimension, (3) a sociability dimension, and (4) an aggressive/impulsive dimension. Eysenck's introversion-extroversion factor combines elements of the activity dimension and the sociability dimension of temperament. The basic idea is that extroverts have a relatively low level of brain arousal, and so they seek stimulation. Introverts, on the other hand, with a higher level of central nervous system arousal, tend to shy away from stimulating social environments.
- Another promising method of addressing biological differences in personality focuses on individual differences in hemispheric activity – that is, relative differences in activation between the right and left cerebral hemispheres. Relatively greater activation of the right hemisphere is associated with greater reactions of fear and distress to a stressful situation; individuals who have a relatively more active right hemisphere are more likely to overreact to a negative stimulus.
- Studies of twins have found impressive similarities in personality between people who have the same genetic makeup. The similarities of identical twins are greater than those of fraternal twins. But the similarity of twins raised apart is less than that of twins raised together, evidence of the influence of the environmental upbringing. There is thus much more controversy about how much of personality is genetically determined. Interestingly, siblings (including twins) raised by the same parents often have personalities that are strikingly different, illustrating their experience of nonshared environmental variance such as having different friends. In moving from childhood to adulthood, the important environmental effects (and the interaction effects of genes and environments) on personality become especially evident. There is an inverse correlation between personality similarity and age for both monozygotic and dizygotic twins; as twins get older, their personalities between more different, although dizygotic twins become especially more different over time.
- There is a certain lure of biological determinism of personality. Even educated people are often attracted to the idea that "other" people are inherently inferior and therefore less deserving of freedom, success, and even life. In the case of Hitler and the Nazis, the inferior subhumans were Jews, Gypsies, homosexuals, and those with physical or mental disabilities.

Going beyond these racist errors, the question still remains as to whether we should tinker with our genes to make a "better" person.

- Unfortunately, it is very easy for people to accept stereotypes and to rationalise the inequities in the status quo. Until very recently, most men (and most women) "knew" that men were better suited by their nature to run governments, to manage property, to become scientists and artists, and to run businesses. It was thought to be women's nature – as the "weaker" sex – to stay home, manage households, and nurture children. Thus, it was perfectly logical that women were not allowed to attend the best colleges, to vote or hold office, to own property, and so on. Allowing women to do so was seen as "going against nature". Today's unfounded prejudices are of course more difficult for us to see (after all, they are prejudices). Should we be suspicious of those political leaders who play up the importance of genetic determinism and ignore the many other important aspects of personality? Given the sad history of misguided searches for "genetic purity", a deeper understanding of personality should be insisted upon.

The Trait Perspective

- How many traits are there? This question turns out to be a pivotal one in the **trait approach** to personality. Francis Galton explored Roget's thesaurus and found over a thousand core words expressive of character. In fact, broadly speaking, the English language contains thousands of words that can be used to describe personal qualities: *aberrant, abeyant, abhorrent, able, abominable,…zany, zingy, zombied, zoned-out*. Gordon Allport counted about 18,000 adjectives. Does this mean that there are thousands of personality traits? If so, it would be very difficult to study personality.
- For a trait approach to succeed, it should use a relatively small number of traits to account well for a person's consistencies. The approach would be even easier if the same traits could be applied differentially to all people – that is, if everyone could be rated on every such trait. But this is not absolutely necessary; perhaps a subset of traits could be used for each person. Furthermore, we need not be limited to simple adjective descriptions of personal qualities; people also differ in terms of their motivations and abilities.
- Trait approaches to personality are certainly common in popular culture. We easily describe an acquaintance as extroverted or conscientious or selfish. We understand what it means to say that a bomber is quiet and reserved yet obsessive-compulsive and shy around women. Can such traits be reliably measured, and do they validly summarise and predict reasons? Can the FBI accurately anticipate a criminal's personality? It turns out that the successful trait psychologist must be a detective every bit as astute and observant as the famous fictional detective Sherlock Holmes.

Gordon Allport's Trait Psychology

- Anyone who has observed people knows that the same person may behave differently in different situations. The same person may also behave differently at different times, with different people, and at different ages. Thus, a simplistic notion of stable traits is obviously inadequate – even the most cheerful and friendly person will at times be angry and aggressive. This variability was well recognised by Gordon Allport, who argued that although behaviour is variable, there is also a constant, core portion for each person. It is this constant portion that is captured by the modern conception of *traits*.
- The notion of traits assumes that personality is rooted very much within the person. Recall that Allport defined *personality* as the "dynamic organisation within the individual of those psychophysical systems that determine his characteristic behaviour and thought". According to this view, each person has unique, key qualities. In recent years, some influential approaches to personality have expanded the focus on the individual to incorporate aspects of the situation as well. These so-called *interactionist* approaches simultaneously study person-by-situation interactions.

The Importance of Culture

- Allport held a lifelong concern with studying prejudice. Like Kurt Lewin, Allport believed that theories would be helpful in practice, and that theories in turn should be informed (and enriched) by practice. Allport studied American prejudice

against Negroes (as they were then called) and Jews at a time when it was not fashionable to do so. He was one of the first American intellectuals to recognise the truth about the Nazi genocide, and his book *The Nature of Prejudice* remains remarkably up-to-date on the practical uses of personality theories.

- Well aware of cultural influences on personality, Allport helped found Harvard's Department of Social Relations, which grouped the areas of personality and social psychology with sociology and anthropology. (This department was dissolved in 1972, as many psychologists began to shun such a broad perspective on human behaviour). Allport emphasised that no one would confuse a Viennese with a Vietnamese or a Venetian, as their culture provides each with ready-made ways of approaching their lives. The interesting questions arise when people immigrate to different cultures – say from Vienna, Vietnam, and Venice to Los Angeles – and try to raise their children. To what extent and in what ways do these new Americans become more alike in their traits?
- In all of these matters – doing applied work in sensitive areas, examining cultural variations, questioning approaches that were too deep or too shallow – Allport was ahead of most of his contemporaries and indeed ahead of many modern personality researchers. Allport integrated the ideas of hundreds of philosophers and scholars, from classical times onward, into his writings. One perspective that particularly bothered him, however, was the behaviorist work of B.F. Skinner. Allport could not stomach any attempts to reduce the complexity and nobility of each human being. Allport thus heartily encouraged the development of humanistic psychology, fearing humans would be degraded if their behaviour were explained in terms of the conditioning of rats and pigeons.

Common Traits

- Because people have a common biological heritage, and because people within a culture have a common cultural heritage, it makes sense to assume that people have in common many organising structures (traits). Allport termed these *common traits*. Common traits are traits that people in a population share; they are basic dimensions.
- For example, in American society, some people constantly push to get ahead of others and to dominate their environment. Other people develop a comfortable style of going along with the flow of things (including yielding to or ignoring the pushy people). Allport thought people could usefully be compared on such dimensions, but he did not believe that such an analysis provides a full understanding of personality.
- What about the motivation driving a person to keep everything clean and well ordered? Allport accepts the Freudian idea that such motivation could have its origins in the childhood socialisation of instinctual tendencies. Allport said that this means that many motives are *functionally autonomous* – they have become independent of their origins in childhood. Thus, it would not make sense to try to trace them back to early childhood (except perhaps in cases of serious psychopathology). The childhood experiences may be the root or origin of the adult tendencies, but they do not continue to influence these tendencies. It would be useful to understand that a desire for neatness and order dominates a person's approach to life, but it is not necessary to unearth where these tendencies originated.
- Allport sometimes used the term *proprium* to refer to the core of personality. (Proprium simply means "one's own" or "one's self"). By this he meant that there are layers within the human psyche, including an irreducible core that defines who we are. In this narrow sense, Allport's view was to close Freud's. Both theorists felt that there are central forces underlying our everyday diverse behaviours. Presumably this core has a biological counterpart (as both Freud and Allport explicitly expected); but such biological structures have not been fully identified, at least not yet. In any case, Allport thought these core motivations were much more rational and positive than the Freudian approach described them to be.

Personal Dispositions

- We learn to recognise thousands of different people by their faces. No two people look exactly alike (except for some cases of identical twins), so it should not be surprising that no two personalities are exactly alike. To fully understand individuals, we need to use methods that take into account each person's uniqueness. Such methods are termed "idiographic". Useful

idiographic methods include flexible self-reports such as Q-sorts. Using these methods, different people can be described differently, rather than in terms of the same few dimensions.

- Allport conceived personal dispositions in terms of a person's goals, motives, or styles; he called it a *nuclear quality*. A Justin Bieber or a Bono (Paul Hewson) has a style that is quite distinctive. Or, consider the complex personality of an artist like Picasso, whose unique personality is revealed through his expressive style. This is a complex personality that can be and has been studied in depth, but not in terms of common traits. Thus, for Allport, a *personal disposition* is a trait – a generalised neuropsychic structure – that is peculiar to the individual. Allport thought the real test of personality psychology comes when we attempt to explain a single concrete life.
- Personal dispositions that exert an overwhelming influence on behaviour are termed *cardinal dispositions* (or ruling passions of a life). Allport gives examples such as Albert Schweitzer's reverence for life, realised in his total devotion to missionary doctoring, or the Marquis de Sade's sexual cruelty, realised in his consuming sexual passions. For a bomber, the cardinal disposition might be a compulsion toward control over a certain self-appearance or worldview, coupled with an immense frustration and insecurity that led to the painstakingly planned violence. Usually, however, personality is organised around several *central dispositions*, fundamental qualities that can succinctly portray an individual. For example, central dispositions are qualities that a professor would mention in writing a letter of recommendation for a student.
- The idea that each individual has some organisation of personality that is unique is troubling to some quantitatively oriented psychologists. If each person is unique, we cannot validly assess each person on the same dimensions, and, so the argument goes, we cannot uncover basic laws of personality.
- Allport's response to such criticisms was not to dismiss nomothetic searches for common traits (seeking general laws for all persons) as futile. He said only that such efforts are incomplete. From a biological perspective, Allport has a good point: modern biology recognises the unique variations of each individual. The artistic vision of Picasso cannot be placed in the same framework as the vision of most people. And from a psychological perspective, no two people share the same upbringing and experiences. Allport thus sees great value in the in-depth psychological study of the individual.
- It is an empirical question as to whether Allport is correct about the need for an idiographic approach – the need to assume personal dispositions. If Allport is wrong, then evidence will eventually demonstrate that everyone can be fully described in terms of a set of common traits. But don't underestimate the dangers of *assuming* that personal dispositions can be ignored. Researchers who rely only on common traits may assume that a single test can be used in all cultures or subcultures. This assumption has, in the past, repeatedly been proven wrong, as exemplars of the dominant culture (European White males) have been used as the standard by which to evaluate others. Interestingly, an early personality textbook by Ross Stagner that gave significant emphasis to the social and cultural aspects of personality has been mostly ignored until recently. Allport did not make such ethnocentric mistakes. An approach to personality that is too ready to discard idiographic approaches may also be an approach that misses important unique information about women, about elderly people, and about people from different religions, cultures, and ethnic groups.
- With these caveats from Allport in mind, we now turn our attention to the most successful modern efforts to establish a useful monothetic scheme – the factor analytic search for common traits.

A Contemporary Trait Approach: The Big Five

- One of the most remarkable but controversial developments in the trait approach to personality has been the emergence of a high degree of agreement about an adequate dimension scheme – one based on five dimensions. Starting in the 1960s but accelerating since then, a vast body of research has converged on the idea that most common trait approaches to personality can be captured by five dimensions. They have come to be called the *Big Five*:

  Extroversion (also called surgency): extroverted people tend to energetic, enthusiastic, dominant, sociable, and talkative. Introverted people tend to be shy, retiring, submissive, and quiet.

Agreeableness: Agreeable people are friendly, cooperative, trusting, and warm. People low on this dimension are cold, quarrelsome, and unkind.

Conscientiousness (also called lack of impulsivity): conscientious people are generally cautious, dependable, persevering, organised, and responsible. Impulsive people tend to be careless, disorderly, and undependable. Early research in personality traits called this dimension Will.

Neuroticism (also called emotional instability): neurotic people tend to be nervous, high-strung, tense, volatile, moody, and worrying. Emotionally stable people are clam and contented.

Openness (also called Openness to experience, culture, or intellect): open people generally appear imaginative, witty, original, and artistic. People low on this dimension are shallow, plain, or simple.

This model emerged from extensive factor analyses of the adjectives used to describe personality and from equally extensive factor analyses of various personality tests and scales. The Big Five approach to personality is mostly researched-driven, rather than theory-based. It is an inductive approach to personality, which means that the theory emerges from the data.

Factor Analysis

- Factor analysis is possible because certain characteristics are associated (correlated) with each other. For example, people who are outgoing also tend to talk more than average, and they also tend to be more sociable. The statistical analysis, therefore, takes apart the scores on each characteristic and places the commonality into an underlying (shared) dimensional score. In this way, it reduces the observed characteristics into a smaller number of dimensions (the *factors*). So, if someone scores high on the statistical dimension we label Extraversion, we know that this person probably tends to be outgoing, talkative, and sociable. Of course, in this example, in reducing these three characteristics to one dimension, we usually lose some information, and some people do not fit the pattern as well as others; but, overall, we gain simplicity and parsimony (economy).
- Are the Big Five traits really there? Can these traits be confirmed in some way other than through analyses of language-based ratings? Dimensions that emerge from a factor analysis or other clustering techniques do not necessarily represent real entities. If we mathematically cluster a number of masculine and feminine characteristics (such as dominant, aggressive, tough, tender, nurturing, feminine), we find evidence for two dimensions – male-like and female-like. These are, of course, "real" categories; that is, we can find biological counterparts to the clusters – men and women. If we cluster personality characteristics, can analogous biological characteristics be found? Allport points out that at one time, the atom – the smallest component of an element – was merely a hypothetical construct. But the development of new theories and new measuring instruments then proved the atom's existence, its "reality". There can be hypothetical constructs that represent something that is really there, even if we are not yet sure exactly what that "something" is. Many researchers believed that the biologically based origins of the Big Five will eventually be found.
- On the other hand, the Big Five dimensions derive mostly from lexical approaches to traits; people (either naïve raters or professional psychologists) have described and tested and categorised others, and these ratings have been reduced to five dimensions. The problem with this is that the raters may be wrong. Raters can be wrong in two ways. First, they can see things that are not really there. It may be that people are prone to see other people in terms of five dimensions. This type of biasing tendency is sometimes called *implicit personality theory*. It means that there are consistencies (and biases) in how we see things, particularly other people's personalities. If this is the case, then factor analyses may be capturing the implicit personality theories rather than the basic dimensions of personality. Second, raters can be wrong by missing (not seeing) things that are really there. Even the best scientists viewed our world as three-dimensional until Einstein showed mathematically that time is a fourth dimension, continuous with the other three. Everyone thought we lived in a three-

dimensional world, but everyone was wrong. Analogously, perhaps observers of personality are wrong, missing a key aspect of others' patterns of responding.

- There is now good reason to believe that at least some basic trait dimensions really do exist; perhaps 3, perhaps 16, but most probably 5 or so dimensions. Research using behavioural genetic and other biological approaches confirms that it makes sense to say there is biological evidence for a small number of dimensions, although somewhat greater or lesser numbers of basic dimensions are not precluded by these analyses. For example, regardless of whether extroversion will eventually be understood in terms of a responsivity of the nervous system, a genetically programmed orientation, a developed pattern of behaviour, or even as a compound product of several other elements, there seems little doubt that there is great value in seeing the construct as representing something that is probably real in a biological sense.

More Than Five? Fewer Than Five?

- In the view of Allport and others, certainly more than five trait dimensions are needed to characterise each individual – that is, when an idiographic approach is taken. The Big Five are meant to be used in nomothetic analyses – that is, when the same dimensions are applied across individuals. But are five dimensions enough for summarising common traits? This question cannot yet be answered. The reason, again, is that there is no compelling and comprehensive theory that explains why five dimensions are sufficient to capture what we need to know when comparing and contrasting individuals.
- What might such a theory look like? It might be derived from new knowledge of brain biology; for example, perhaps five distinct kinds of biological responding might be identified. Or it might be derived from a functional analysis of evolutionary pressures on survival; for example, perhaps five sorts of skills – such as bonding with others, or finding resources – may be key to what it means to be a human being. Relatedly, however, it may have been most useful (in an evolutionary sense) for people to be able to ascertain these five dimensions in others. It can be argued that we need to know who will cooperate with us (i.e., be agreeable), who is going to be a successful leader (i.e., be extroverted), and who is going to be dependable (i.e., be conscientious). Therefore, people may have evolved an ability to detect and understand these individual differences in others.

Eysenck's Big Three and Related Alternatives

- Could there be fewer than five basic dimensions of personality? It might be that two or three of the Big Five trait dimensions are a core part of the organism, with the other two or three merely derivatives; that is, perhaps biological factors predispose a person to behave in one of three basic types of ways, but that these can be clearly subdivided. For example, the basic extroverted individual could then be further categorised in terms of activity level, sociability, and excitability. This the position of Hans Eysenck. Eysenck believed that fewer than five basic dimensions are the basis of personality. Rather, he proposed that all other traits derive from three biological systems.
- Whereas Cattell believed that personality theory should be the criterion for selecting the variables – that is, the data – to be used in factor analyses, and whereas many Big Five researchers take a fully inductive approach, Eysenck goes further and believes that various other sorts of evidence should also guide the selection of the factors, that factor analyses alone should not guide our structuring of the basic dimensions. For example, there is evidence that people's tendencies on at least several characteristics – anxiety level, friendliness, self-esteem, and openness to new experiences – generally remain fairly stable throughout adult life. If you are calm and outgoing at age 25, you will probably not be crotchety and nervous and dogmatic at age 60. However, people do tend to become more conscientious and somewhat more agreeable as they age.
- The first dimension of personality, according to Eysenck, is *extroversion*. It includes Cattell's factors of outgoingness and assertiveness. The second is *neuroticism*; this dimension includes Cattel's factors of emotional instability and apprehensiveness. The third factor is *psychoticism* – a tendency toward psychopathology, involving impulsivity and cruelty. Psychoticism includes Cattell's factors of tough-mindedness and shrewdness. In terms of the Big Five, Eysenck's psychoticism involves low Agreeableness and low Conscientiousness; his extroversion and neuroticism dimensions are

similar to those of the Big Five. Eysenck does not directly account for the Openness factor, and indeed, Openness is the least defined and most murky Big Five factor, both theoretically and statistically.

- Eysenck's approach (along with the related work of Jeffrey Gray) is one of the few to endeavour to take into account the biological bases of personality (what Allport terms its "psychophysical" aspects), personality theory, and evidence arising from rigorous empirical and statistical analyses of traits. Interestingly, Eysenck's parents were actors, and he himself became an extremely passionate and outspoken psychologist and intellectual, often at the centre of intellectual controversy. Thus, it is not surprising for Eysenck to ask such intriguing questions as whether extroversion runs in families.
- Despite progress in understanding the Big Five, Cattell continued to assert that 16 general personality factors are essential. Cattel was impatient with psychologists who did not accept his scheme, frustrated that psychologists do not, he says, want to remember 16 things at the same time. Cattell himself also turned his attention to motives and interests. He believed that a psychometric approach should be used to analyse instinctive drives – sex, fear, assertion, self-protection – and attachments such as love of home, or spouse, or job. Importantly, Cattell also urges analysis of changes over time. For example, does getting married tend to change the conscientiousness factor of personality in systematic ways, making one more conscientious? How is this transformation best represented mathematically? By turning attention beyond fixed traits located within the individual, and toward everyday motives, interests, and behaviours, personality researchers are now pointing to the complexity of human personality and to the necessity of considering the broader context of personality.
- Interestingly, even proponents of the Big Five approach to personality generally find it expedient to turn to additional trait descriptions to describe personality fully. (They do this even when talking about common traits). Sometimes these are called subfactors or facets, but they all involve a further elaboration of the Big Five model. For example, anxiety and depression are closely related aspects of Neuroticism, but clinicians treating anxiety disorders and depressive disorders find the distinction to be a very significant one. In fact, different psychotropic drugs may be prescribed to treat the two conditions – for example, Valium for anxiety and Prozac for depression. The fact that these drugs act in different ways in the brain suggests that Neuroticism may prove to be too broad a factor. But if anxiety and depression turn out to be two variants of what can go wrong with the same underlying neurological system, then the superordinate category Neuroticism may prove correct after all.

Distinct Categories or a Continuum?

- Most people don't score at the extremes of traits – only a few people are 100% extraverted or 100% introverted – so most score somewhere in the middle. For that reason, it's better to think of traits as a continuum instead of categories. Although labels such as *extravert* and *introvert* can be useful, they leave behind a lot of important information. Someone who scores on the 40th percentile on extraversion, for example, is technically an introvert, but not as much as someone who scores at the 5th percentile. In research, the whole score is usually used, similar to the percentile you got for each of the Big Five when you got your own results. We use labels such as *extravert* for the sake of simplicity, but keep in mind that the label captures a wide range of above-average extraversion scores from the 51st to the 99th percentile. In general, results about extraverts will apply even more strongly to someone with a very high score (the 99th percentile) than to someone with merely above-average score (the 51st percentile).
- Students often wonder if scoring high on one Big Five trait makes it more or less likely they will score high (or low) on another. For example, are introverts also more neurotic, on average? Yes, they are: neurotic people are less extraverted, less agreeable, and less conscientious. Extraverts are higher in agreeableness, conscientiousness, and openness to experience. However, this is not always the case – these correlations are fairly weak, so it's definitely possible to be a neurotic extravert or a conscientious introvert.

Does the Big Five Translate Across Other Cultures?

- Does the Big Five "work" in other languages and cultures? It seems to work pretty well. Schmitt and his colleagues translated the Big Five Inventory into 28 languages and administered it to individuals from 56 nations, finding the same five personality domains. Researchers have also used the lexical method to identify adjectives in other languages that describe personality and cluster together just as the Big Five does. For example, Spanish has a "Big Seven" with two factors more unique to Spanish (positive valence and negative valence) and the last five similar to the Big Five. In Chinese, the first four of the Big Five stay the same, but openness to experience is replaced by a different trait called interpersonal relatedness.
- Overall, most languages have domains for extraversion, agreeableness, and conscientiousness, with more variation in whether neuroticism, or openness is included and whether a domain capturing traits related to honesty and humility is added. Research using Big Five measures has been conducted in countries on every continent except Antarctica.
- Do animals have the Big Five personality traits, too? The answer appears to be yes. For example, cats show differences in emotional reactivity (similar to neuroticism), affection (similar to agreeableness), energy (similar to extraversion), and competence (similar to conscientiousness). Pigs differ in their level of aggression (similar to agreeableness), sociability (similar to extraversion), and exploration-curiosity (similar to openness to experience). Pet owners also differ in their personality traits – dog owners are more extraverted, agreeable, and conscientious and less neurotic and open-minded than cat owners.

Types

- Should we divide people into certain categories or classes, rather than rate them along trait dimensions? For example, it is easy to distinguish men from women, or preadolescents from sexually mature adults. In discussions of personality, these categories or classes are termed *types*. The notion of types is in the discussion of assessment of people thought to be prone to heart disease – the idea of Type A versus Type B. Freud had the anal character type, who is stingy. Sheldon also had a theory of body types (somatotypes) related to personality.
- The idea of types is that there are discrete classes of people. Boundaries between classes are usually not so clear-cut, however, when we are dealing with psychological characteristics. Categories such as extroversion and introversion are broad, but no one is completely introverted or completely extroverted. Rather, it is a matter of degree. Theories of personality that include distinct types are usually just the first step on the way to a more complete understanding of traits. Nevertheless, type theories may be useful in providing ideals or models of personality to which real people can be compared.
- Might there indeed be certain ways in which people are categorically different and do not fall along a continuum? That is, are some personality differences not just a matter of degree – with qualitative (not just quantitative) differences? Rather than make blanket assertions about type theories at this time, it is prudent to examine each theory as it is proposed.

Limits of Trait Conceptions

- There is always some danger that we will not be careful in how we use the idea of traits. We might underestimate the role of other aspects of personality and the role of the social situation. We might overlook the individual's personal dispositions or the fact that basic dimensions do a better job in describing some persons than others. Trait conceptions generally lie in direct contradiction to behaviourist and social learning approaches, which emphasise the environmental causes of patterns of behaviour. Still, when we follow the lead of Gordon Allport and apply the empirical approach to understanding the person as a whole (as a Gestalt), we can indeed succeed in achieving a significantly greater understanding of what it means to be a person.
- Do professional profilers of criminals at the FBI do even better? One study compared professional profilers to detectives, psychologists, and college students. When presented with actual materials from a sex crime case, the professional profilers were indeed more accurate and comprehensive, but the experienced police detectives and the psychologists also did quite

well. Only the college students did poorly. At the least, this and related studies suggest that experience in studying personality and motivation can lead to some documentable improvements and successes, but the optimal way to proceed is as yet unknown.

Conclusion: Trait Aspects of Personality

- The trait approach to personality searches for a small number of core dimensions that can usefully summarise a person's consistent patterns of responding. The number of such dimensions is still in dispute. Cattell's factor approach to personality (based primarily on statistical factor analysis) sees the necessity of 166 traits. On the other hand, Hans Eysenck believed that all traits derive from three biological systems, producing the three factors of extroversion, neuroticism, and psychoticism. But many, if not most, researchers now agree that five dimensions do a satisfactory job in most circumstances – the so-called Big Five of Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness.
- From roots in ancient Greek notions of temperaments and characters, the trait approach bloomed in the 1930s, fed by Jung's notions of inward and outward orientations, the statistical analyses of quantitative psychologists, and Gordon Allport's extensive theorising about capturing the fullness of each individual's life. Modern approaches have adopted Allport's notion that traits are the invariant aspects of a person that accompany the changing parts; there are core tendencies that give a life its uniqueness and consistency, even though personalities undergo variations across time and situation.
- Trait approaches have been fairly successful in predicting important life outcomes. In particular, conscientiousness predicts a wide range of desirable outcomes, from work success and relationship success to health and long life. Most trait psychologists assume that there are biological bases to these consistencies, and so they are quite interested in the proliferation of knowledge about the biological bases of personality. Most trait psychologists are also willing to accept that there are cognitive and psychodynamic influences on traits. Yet a trait approach, like any single approach to personality, has proved inadequate to capture fully what it means to be a person. In particular, trait approaches need to be complemented by approaches that recognise the noble, spiritual aspects of human beings and that consider the situational demands on behaviour.