Extraversion

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Abstract

Extraversion is a term often associated with a range of human behaviors and experiences. Biological, environmental, and even developmental features have variously been identified as important contributors to variance in these. Our understanding of how these features form an overall structure is, however, still developing. Attempts to better understand extraversion as a complex, dynamic system often one means by which the breadth of knowledge accumulated thus far might be integrated.

Extraversion is a personality trait that broadly describes differences between people in their social interactions, positive emotions, impulsivity, and energy levels. A highly extraverted person is generally thought to be outgoing, energetic, enthusiastic, and positive. Someone with low levels of extraversion (sometimes called introverted) is thought to be quiet, shy, calm, and slow-paced. Extraversion has long been recognized to be an important feature of human personality. From the typologies offered by the ancient Greeks and Romans, through to the sophisticated models of today, the behavioral and experiential variance described by extraversion has been considered an important descriptor of individual differences. The paragraphs below summarize several different approaches to understanding extraversion, including psychoanalytic, psychometric, and biological approaches. Different models of extraversion are compared, real-life outcomes associated with extraversion are described, and future directions in extraversion research considered.

Historical Overview of Extraversion

Ancient Typological Accounts

The earliest descriptions of personality were those of Hippocrates and Galen, who proposed that people could be classified as one of four personality types, each associated with a physical element: sanguine (air), choleric (fire), melancholic (earth), and phlegmatic (water). Each type was associated with particular physical features. Both sanguine and choleric types contained elements now considered aspects of extraversion. Sanguine types of people were social, expressive, and positive in outlook. Choleric types were energetic, wilful, and passionate.

Psychoanalytic Accounts

The earliest personality model to explicitly describe extraversion was Jung's analytical psychology. He proposed 16 personality types, these being combinations of four more basic, dichotomous sets of individual characteristics: extroversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving. According to Jung (1916), for each of these dichotomous pairs, individuals could be classified as one or the other: extrovert or introvert, judger or perceiver, and so on.

This means that while Jung regarded extroversion to be a fundamental aspect of human personality, he described it as one that characterizes some, but not all people. Those who are not extroverts, Jung described as introverts. The fundamental distinction between these targeted differences in the value individuals attach to external versus internal stimuli. These differences were thought to account for important differences in how people behave. Thus, extroverts were thought to primarily value the external world, causing them to direct their energy outward. Introverts, on the other hand, were thought to primarily value the internal world, leading to an inner focus. Jung's theory formed the theoretical basis of the extraversion/introversion classification in the widely used Myers-Brigg's Personality Test.

Early Lexical Accounts

In contrast to the earlier approaches, the lexical approach to personality viewed extraversion as a quality that all people possess to different degrees. This is a dimensional approach rather than a typological approach to personality. The lexical approach uses everyday language as its starting point. The premise of this approach is that important psychological traits are likely to be encoded in everyday language. For example, the existence of trait adjectives such as 'energetic,' 'positive,' and 'excitable' suggests that differences in these traits provide useful information about what people are like. Allport and Odbert (1936) identified over 4500 such adjectives within the English language. Cattell (1943) later examined this word-list using factor analysis – a statistical technique for grouping a large number of variables into a smaller number of factors, based on the strength of association. By doing this, terms that describe the primary factors in which individuals differ were identified. For example, it was noted that people's ratings of others on the terms 'happy,' 'positive,' and 'enthusiastic' were generally similar, as were ratings on the terms 'reliable,' 'industrious,' and 'consistent.' This was taken as evidence that individual differences in two factors might explain differences in how people are rated in relation to these six adjectives.

Cattell's (1945, 1947) analyses suggested that somewhere between 12 and 20 factors could account for all personality differences between people. In these early analyses, extraversion did not emerge as a single factor but was represented by several related factors (e.g., dominance, liveliness). Later factor

analyses found that five factors best explain associations among adjective ratings, and extraversion emerged as one of these five key factors (Tupes and Christel, 1961; Norman, 1963). Newer lexical models suggest a six-factor model, but still include extraversion as a key personality factor (Lee and Ashton, 2004).

Early Biological Accounts: Eysenck

Eysenck (2008/1967) believed that differences in extraversion were due to physiological differences in brain systems that caused some people to be more easily aroused than others. Specifically, he proposed that the ascending reticular activating system (ARAS) regulated arousal. People differ in the sensitivity of this system, which causes them to respond differently to their environment. A moderately stimulating environment might cause people with a very sensitive ARAS to feel over-stimulated and retreat (i.e., to behave like introverts), but people with a less sensitive ARAS to feel understimulated and seek out additional stimulation (i.e., to behave like extraverts). In this model, the key characteristic of extraversion is impulsivity – social characteristics like friendliness and gregariousness were not originally considered as part of the extraversion trait.

According to Eysenck (1965), differences in extraversion predict how easily people form automatic associations. One classic experiment presented a tone and a puff of air to the eyeball several times. The puff of air caused people to blink. When the tone had become associated with the puff of air, people would blink when they heard the tone, even if the puff of air was not present. People with low extraversion were quicker to form this automatic association, possibly because they were more aroused by the stimuli in the first place. That is, extraversion moderates the ease of classical conditioning.

Further Development of the Biological Approach

Reinforcement Sensitivity Theory

Gray (1970, 1987) extended Eysenck's research on extraversion and conditioning by distinguishing between positive and negative stimuli. He claimed that extraverts may be slower to form associations only for negative stimuli (like the puff of air), but are faster to form associations when stimuli are positive. That is, conditioning is controlled by two systems: (1) one that is reactive to positive stimuli and (2) one that is reactive to negative stimuli. The system representing reward sensitivity (i.e., reactivity to positive stimuli) was called the behavioral activation system (BAS), while the system representing punishment sensitivity (i.e., reactivity to negative stimuli) was called the behavioral inhibition system (BIS). This theory is known as reinforcement sensitivity theory (RST).

According to RST, these systems control the conditioning process by differentially reinforcing particular behaviors. Thus, those with a sensitive BAS system were thought to learn more readily from positive stimuli and therefore be more prone to impulsivity. Those, however, with a sensitive BIS system were thought to learn more readily from negative stimuli and therefore be more prone to anxiety and caution generally.

By this account then, extraversion was not regarded as a fundamental personality trait. Instead, impulsivity and anxiety were considered primary, and extraversion was described as a construct that combines both. RST then described extraversion in terms of a low tendency toward anxiety (or a low degree of punishment sensitivity) and a moderate tendency toward impulsivity (or a moderate degree of reward sensitivity).

Revised Reinforcement Sensitivity Theory

RST was later revised and is now known as revised reinforcement sensitivity theory (RST-r; Gray and McNaughton, 2000). In this revision, the two basic systems of reward sensitivity and punishment sensitivity were reinterpreted to represent approach and withdrawal tendencies. Approach tendencies were still thought to be expressive of the BAS, but withdrawal tendencies were thought to be expressive of a fight, flight, freeze system (FFFS). The BIS was still a feature of the theory, but was reconceptualized as a sophisticated system that resolves conflict between the BAS and FFFS. Such conflicts were thought to occur in two circumstances: (1) when more than one positive or negative stimulus is encountered, requiring a choice between the two and (2) when both systems are activated – for example when a person is attracted to someone, but is simultaneously afraid of rejection. When such a conflict occurs, the BIS was thought to inhibit both the approach and withdrawal systems in an iterative manner until a single behavior dominates. RST-r, therefore, suggests the personality system as a whole to be both complex (made up of many parts) and dynamic (changing over time).

This new theory led some researchers to reexamine whether extraversion is a primary personality trait. Yet many studies show that measures of the BAS are strongly related to extraversion. Such results suggest that extraversion may actually be the fundamental trait for reward sensitivity (Smillie et al., 2006).

The Underlying Structure of Extraversion

Extraversion is a broad personality trait that reflects an integrated network of narrower constructs (e.g., sociability, positive affect, impulsivity, and reward sensitivity). Perhaps the first empirical exploration of the underlying structure of extraversion was the factor analysis of Guilford and Guilford (1934). They found evidence for up to 18 underlying elements of extraversion. The four most important elements represented an approach tendency, an anxiety/withdrawal tendency, impulsiveness, and self-interest.

Many different personality models include extraversion as a primary trait. However, different models propose different underlying elements of extraversion, usually referred to as facets. Table 1 compares several different faceted models of extraversion, showing the conceptual similarity between different facets. All models include sociability, which represents a preference for social interaction. There is much less consensus regarding the other facets. For example, some models propose surgency (a type of reward sensitivity that produces positive affect) as the defining feature of extraversion, whereas other models do not include surgency at all (Goldberg, 1990). Similarly, while Tellegen (1985) proposed

Table 1 Conceptual representation of the facets of extraversion in various models of extraversion

	Eysenck personality questionnaire-revised (Eysenck et al., 1985)	Sixteen personality factor questionnaire (Cattell et al., 1988)	Multidimensional personality questionnaire (Tellegen, 1985)	Revised NEO personality inventory (Costa and McCrae, 1992)	HEXACO personality inventory (Lee and Ashton, 2004)
Sociability	Sociable	Warmth	Social closeness	Warmth Gregariousness	Sociability
Dominance	Dominant Assertive	Dominance	Social potency	Assertiveness	
Social boldness		Social boldness			Social boldness
Positivity	Surgent		Well-being	Positive emotions	
Energy	Active Lively	Liveliness		Activity	Liveliness Expressiveness
Excitement-seeking	Sensation-seeking Venturesome			Excitement-seeking	
Carefree	Carefree				
Self-reliance		Self-reliance			
Achievement			Achievement		

that positivity was the defining feature of extraversion and eliminated sensation-seeking elements from his model, the recent HEXACO model does not include positivity as part of extraversion at all.

DeYoung et al. (2007) recently suggested an intermediate level between narrow facets of personality (such as impulsivity) and broad domains of personality (such as extraversion). They propose that there are two aspects that underlie each personality domain. Their model is an extension of the NEO-PI-R model of personality shown in Table 1. In the NEO-PI-R model, there are six specific facets that underlie extraversion: warmth, gregariousness, assertiveness, positive emotions, activity, and excitement seeking. De Young et al. propose that these can be grouped into two aspects of enthusiasm and assertiveness. Enthusiasm is an aggregate of the gregariousness, positive emotions, warmth, and excitement-seeking facets. Assertiveness is an aggregate of the excitement seeking, activity, and assertiveness. Extraversion is the only one of the five domains where a facet (excitement seeking) contributes to both aspects.

Extraversion across the Lifespan

Although the domain of extraversion appears stable over time, the lower-order facets may show systematic age-related change (Soto et al., 2011). A longitudinal study of age-related personality change in adults found that (1) excitement seeking decreases after 30 years of age; (2) activity is largely stable until 40 years of age, when it begins to decrease; (3) positive emotions and warmth increase until about 50 years of age, with positive emotions decreasing from 60 years and warmth decreasing from 70 years; and (4) assertiveness increases until 60 years of age and then decreases slowly (Terracciano et al., 2005). Cross-sectional research found that while middle-aged people and older people have similar levels of gregariousness and assertiveness, older people have lower levels of warmth, activity, excitement seeking, and positive emotions than middle-aged people (Roepke et al., 2001). These results suggest that at the facet level, extraversion continues to change across the adult lifespan.

Extraversion and Valued Outcomes

Extraversion predicts valued outcomes at work, school, and in personal life. For work outcomes, the largest effects are for leadership and job satisfaction. Of the big five personality domains, extraversion shows the strongest relationship with transformational leadership and among the strongest with job satisfaction (Bono and Judge, 2004; Judge et al., 2002). Extraversion shows a positive association with academic performance in the early years of school but a negative association in high school and university (Poropat, 2009). This may be due to the different mechanisms underlying academic achievement at different stages. For example, socialization with teacher and peers may be a key mechanism for achievement in the early years of school, whereas a preference for socializing at university may have a detrimental effect on grades. Extraversion also relates to subjective well-being, such as life satisfaction and happiness (Cooper and DeNeve, 1998).

There is some empirical evidence that different facets of extraversion show different relationships with valued outcomes. For example, a recent meta-analysis predicted job performance from the six extraversion facets and two extraversion aspects of DeYoung et al.'s (2007) aspects model (Judge et al., 2013). Both aspects of extraversion showed a small association with performance, but this was mainly accounted for by the facets of positive emotions and activity. In fact, the excitement-seeking facet was associated with poorer job performance. These results highlight even when extraversion shows a zero or very small relationship with a valued outcome; some of the underlying elements (either facets or aspects) might still be important predictors.

Extraversion: A Complex, Dynamic System?

A complex, dynamic system is one with multiple underlying features that change over time. Extraversion can be regarded as a complex, dynamic system as (1) it has multiple facets underlying the construct as a whole (i.e., it is complex) and (2) these facets change over time (it is dynamic). For this reason, extraversion might be explained in terms of Cloninger's et al. (1993) Psychobiological Model of Temperament and Character. This

model describes personality as a complex dynamic system dependent on two sets of characteristics. First, four biologically based temperaments drive personality (novelty seeking, harm avoidance, reward dependence, and persistence). Second, the expression of these temperaments is modifiable by three character traits (self-directedness, cooperativeness, and self-transcendence). These character traits describe how an individual learns and adapts to their environment. Two of the temperaments (novelty seeking and reward dependence) relate to extraversion and one of the character traits (cooperativeness) relates to reward dependence (Stallings et al., 1996; DeFruyt et al., 2000). Therefore, changes in extraversion facets across the lifespan can thus be described in terms of a dynamic system involving such temperament and character traits.

Complex, dynamic systems have many properties that set them apart from simple systems. These vary according to the type of system being theorized, but include nonlinearity (producing outcomes that are disproportionate to their inputs), fractality (having self-similar patterns), and even chaos (being determined, but unpredictable) (Gregson and Guastello, 2010; van Geert and Steenbeck, 2008). The presence of any of these three features would have important ramifications for how extraversion is understood.

However, methodologies designed to identify these or related features of complex dynamic systems have yet to be applied to research on extraversion. It is possible that a complex systems approach may be able to integrate multiple findings into a single theory, explaining developmental changes in extraversion facets, different facets' relationships with valued outcomes (e.g., workplace performance and academic achievement), as well as behavior-environment contingencies. Complex system methods may thus represent a promising new direction for identifying the structures and operations that underlie extraversion.

See also: Emotional Regulation; Factor Analysis and Latent Structure Analysis: Confirmatory Factor Analysis; Factor Analysis and Latent Variable Models in Personality Psychology; Five Factor Model of Personality, Assessment of; Five Factor Model of Personality, Facets of; Personality Assessment: Overview; Personality Development: Systems Theories; Personality and Educational Outcomes; Personality, Biological Models of; Personality, Trait Models of; Personality: Historical and Conceptual Perspectives; Self-Organizing Dynamical Systems; Temperament.

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http://www.cymeon.com/rrst – CYMEON Research rRST Profile. At this link, you can take a personality test based on the revised Reinforcement Sensitivity Theory personality model and get feedback on your personality scores.

http://www.hexaco.org – The HEXACO website. This link describes the research, theory, and personality tests used in the recent six-factor HEXACO model of personality.

http://www.ipip.ori.org – The International Personality Item Pool. This website provides multiple public-domain personality test items representing the major measures of personality. These are free to use for research purposes.

http://www.personal.psu.edu/j5j/IPIP – The International Personality Item Pool NEO Personality Inventory. At this link, you can take a personality test based on the NEO-PI-R personality model and get feedback on your personality scores at the domain and facet level.

https://personality-project.org – The Personality Project. This is a collection of resources that provides a broad array of methods and theory for the study of personality.

http://www.youtube.com/watch?v=K-HSiZUxTlk – 1980 video footage of Hans Eysenck discussing the Biological Basis of Personality.

http://www.youtube.com/watch?v=Au-1LJP1bAU – 2013 video footage of William Revelle giving the Hans J Eysenck Lecture at the International Society for the Study of Individual Differences (ISSID) in Barcelona, 2013.