General Introduction

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In the Editors' General Introduction to the first (2009) edition of this handbook, we acclaimed the success of the trait approach to personality (Matthews, Deary & Whiteman, 2009). Since that time, this approach has been boosted by growing consensus among researchers on the nature and measurement of the major traits, by remarkable advances in genetics and neuroscience, by increasing integration with various fields of mainstream psychology, and by applied utility – the maturity of the field is attested by the establishment of new journals, notably *Personality Neuroscience* (published by Cambridge University Press; see Corr & Mobbs, 2018). Such has been progress, trait researchers now pursue "normal science" (Kuhn, 1962): Common core assumptions are shared about the nature of personality and former vexatious positions are seen as far less relevant. There is a reasonable agreement on dimensional models, the importance of both biological and social factors, and the dependence of behavior on person × situation interaction. Within this consensus, a variety of still-burning questions remain (Fajkowska & Kreitler, 2018); for example, on the causal status of traits, sources of stability and change in personality over the lifespan, and the respective roles of trait and state factors in behavior.

We must also acknowledge advances in alternative conceptual models for personality that build on the social-cognitive, humanistic and idiographic traditions of the field (Cloninger, Chapter 1). Historically, proponents of different schools of personality research tended to talk past – sometimes even over – each other. Concomitantly, debate often devolved into forced choices between rigidly dichotomous alternatives: genes versus environment, brain processes versus social learning, trait versus situation, nomothetic vs. idiographic, conscious versus unconscious, fixed versus changing. The accumulation of empirical evidence has demonstrated the sterility of these choices – "all of the above" are required for a full account of personality.

The existence of multiple perspectives on personality does not necessarily imply that we can or should aim for a grand, integrated theory, although some have tried (for a special issue on this topic, see Corr, 2020). Some theories may diverge so much from trait models in their basic assumptions that no conceptual integration is possible, or indeed desirable. For example, "Viewed through the constructionist lens, the person ceases to be a unified ensemble of stable psychological structures and traits and becomes a fluid, fractured, and changeable assemblage, distributed across and produced through social interactions and relationships" (Burr, 2018, p. 1). It is difficult to anticipate productive dialogue between trait theorists and radical constructionists.

However, the growing convergence of trait theory with traditionally divergent perspectives is a cause for optimism. Unconscious elements of personality – previously the deep and dark preserve of psychoanalysis – are now studied rigorously as implicit traits (De Cuyper et al., 2017). McAdams (2015) suggests integration of trait perspectives on personality development with two others. He points to individuals as motivated agents who develop a stable theory of mind, goals and values; and cognitive and motivational perspectives (e.g., Carver, Chapter 22) illustrate how this perspective adds to the explanatory value of traits. McAdams (2015) also emphasizes that people are autobiographic authors who construct and share life stories, or narrative identities – past research recognizes stability in life stories. Hence, this perspective provides a departure point for regarding the narrative approach as complementary rather than opposed to trait theory – it may also provide a meeting point between trait models and both qualitative and idiographic approaches.

Trait theory may never satisfy those seeking to understand the individual person or the intimacy of the person-situation relationship, or the humanists that want to help humankind. However, while different schools of personality research may be traveling to different destinations, they are increasingly willing and able to communicate with one another. For example, Poropat and Corr (2015) proposed a "Cronbachian" approach to integrative personality theory that goes beyond typical trait models in accommodating multiple sources of variance, including contextual factors, observers' perceptions of the individuals and intra-individual differences.

This second edition of the handbook has been thoroughly updated, with expanded chapters of those that were included in the first edition and with the addition of chapters of central relevance to personality psychology. As would be appropriate, the foundational issues are retained from the first edition and the Applications section (Part VII) has been systematized to reflect the broad range of domains. There is also a statistical analysis and computer programming appendix which reflects the increasingly analytical sophistication of the field. As a comparison of both editions will show, this second handbook is representative of the entire field of personality as it is today. The quality of chapters is assured by the status of the contributors who are leading researchers in their respective fields.

FOUNDATIONAL ISSUES

Part I of the present handbook introduces some of the basic conceptual issues that have shaped inquiries into personality. In this Introduction, we highlight: (1) the psychological meaning of measures of personality; (2) the coherence of personality in a holistic sense; and (3) the role of personality in predicting behavior. Prediction of behavior has often been a primary selling point for the trait approach, demonstrating that quantitative trait measurement has "added value" beyond a superficial description of self-evaluations (Costa & McCrae, 1992). However, meaning and coherence have proved more challenging, especially if we want a psychological understanding of traits that goes beyond a simple identification between the trait and individual differences in a specified brain system (Matthews, 2016).

A strictly constrained neuroscience of personality has the advantage of conceptual clarity and an ever-increasing methodological sophistication. If traits are direct expressions of activity in brain systems for arousal (Eysenck, 1967) or motivation (Gray, 1981), both meaning and coherence are defined by theories of the brain systems concerned. However, this perspective on traits is only satisfactory if we are willing to commit to strong neural (or "greedy") reductionism (Lilienfeld, 2007; Smillie, Zhao & Barford, 2014). While such a commitment is necessarily anathema to cognitively oriented researchers, contemporary neurobiological researchers increasingly incorporate abstract knowledge representations into theory. For example, the goal conflict resolution approach central to Gray's (1981) account of the Behavioral Inhibition System implies some representation of approach and avoidance goals (McNaughton & Corr, 2004; see Corr & Krupic, 2017). Conversely, cognitive-social accounts of personality that ignore the neurological substrate are incomplete. That is, whatever the researcher's initial starting point for theory, a satisfactory account of personality requires reference to multiple conceptual frameworks.

Alternative conceptual frameworks can be defined and integrated within the trilevel explanatory framework of the "classical theory" of cognitive science (Pylyshyn, 1999). Complex, "intelligent" systems are organized at three different levels: biophysical, symbolic and semantic. The biological or physical level describes the physical and chemical processes that support the functional properties of symbolic information-processing and corresponds to neuroscience. The intermediate symbolic or syntactic level refers to a formal algorithm for computing representation-based problems, corresponding to computational cognitive psychology. The semantic or knowledge level refers to relationships between abstract representations, including but not limited to declarative beliefs. It may also be construed as an account of system operation in terms of rational principles, including system goals (Newell, 1982). The trilevel framework distinguishes different strands of personality research, relating to neurological bases, formal information-processing models and high-level accounts of the self and personal motivations (Matthews, 2004a, 2018).

The trilevel framework also provides a basis for an explanatory pluralism (Lilienfeld, 2007) in personality theory that recognizes the value of theories at different levels of explanation. Higher levels are emergent from lower levels, but emergent cognitive phenomena are diverse and complex (Sloman, 2009), so that multiple layers of theory are not directly commensurate with each other. We can, nevertheless, pursue a "patchy reductionism" (Lilienfeld, 2007) that might, for example, map cognitive to neural constructs within some limited domain. Such an approach may not satisfy social constructivists and humanistic theorists, but it does bring a diversity of scientific approaches to personality into a common arena.

The cognitive science perspective also implies that meaning and coherence may look different at different levels. We can variously attribute traits to individual differences in the calibration of brain systems shaped by evolution, in biases in the functional cognitive architecture that controls information-processing, and in the person's high-level understanding of their place in the world. For example, anxiety might be variously attributed to high sensitivity of a brain punishment system, cognitive biases in selecting and interpreting possible threat stimuli, and understanding oneself as vulnerable to a dangerous world (Matthews, 2004b). Similarly, the coherence of traits may be derived from the unified nature of major brain systems, the importance of cognitive systems for attention and memory, or the person's core goals and strategies for adaptation to the major challenges of life (Matthews, 2008).

A multi-leveled perspective also requires rethinking the role of personality in the prediction of behavior. Recent years have seen an explosion of studies demonstrating that traits are associated with a range of important real-life outcomes (Matthews et al., 2009). In line with interactionism, the role of situational moderators in enhancing prediction is also well-documented (Judge & Zapata, 2015). However, theoretical accounts for trait-outcome

associations have lagged the data, and a focus on the appropriate level of explanation for the empirical findings would be welcome. Explanations should also accommodate temporal factors, given that real-world outcomes often unfold over periods of months or years. We need both a fine-grained understanding of how personality factors bias the dynamic interaction between the individual and the environment in some given social encounter, as well as a longer-term understanding of how personality and situation interact developmentally over periods of years, or even decades (e.g., Roberts, 2018).

These and other foundational issues are covered in the first section of the book. Cloninger (Chapter 1) reviews the historical arc that has seen trait psychology go in and out of favor. The underlying dialectic is that of contrasting scientific and humanistic approaches. In Cloninger's view, there is a healthy tension between these perspectives that stimulates theory and research. A hypothesis-testing approach modeled on the physical sciences risks sterility and neglect of the roles of qualitative personal experience, intention and choice, and the grounding of personality in life history. Cloninger also suggests that eclecticism remains of value until such time as we have a satisfactory unified theory.

Weiss and Deary's (Chapter 2) review of the trait approach affirms its success in measuring and validating key dimensions of personality. They also highlight that some of the fundamental questions posed by Gordon Allport in his foundational account of traits have yet to be answered satisfactorily. There is still no consensus on what is the basic unit of personality or on explanatory, causal models linking traits to behaviors. A particular challenge is the highly polygenic nature of the genetic bases for traits demonstrated in Genome Wide Association Studies (GWAS), implying that neurobiological theories must accommodate a high level of complexity.

A longstanding research question is the extent to which self- and observer-perceptions of personality attributes converge. As Biesanz and Wallace (Chapter 3) discuss, historical concerns about the validity of self-perceptions have been, at least, partially allayed by theoretical and methodological advances that support demonstrations of convergence. Deeper questions concern the nature of interpersonal perception, and recent work has provided a range of insights into the factors that influence accuracy and bias in evaluating the personality of others.

The replacement of simple-minded trait and situationist assumptions by interactionism is a necessary step, but simple acknowledgement of interaction does not take us very far. Asendorpf and Rauthmann (Chapter 4) review contemporary understanding of interactions between stable factors (traits, environmental characteristics) and fluctuating factors (states, situations). Modern data-analytic techniques illuminate the different forms of dynamic interactions that take place between the individual and the environment. People can shape their environments in different ways, but over time, environments can also shape personality.

The unconscious tends to bring to mind the qualitative and idiographic (not to say idiosyncratic) contributions of traditional psychoanalysis. However, contemporary work reviewed by Perugini, Richetin and Costantini (Chapter 5) brings unconscious personality attributes into the realm of quantitative science. The validity of tests such as the Implicit Association Test is increasingly supported by data, though various issues remain for future research. These include optimizing test methodology and procedures and understanding convergences and divergences between explicit and implicit measures.

As with personality, research on emotion has provided an arena for integrating multiple psychological disciplines. Reisenzein, Hildebrandt and Weber (Chapter 6) review relevant research, covering individual differences in emotional dispositions, styles of emotional regulation, and nonverbal emotional communication, and their relationships with major traits. Such efforts may contribute to the overarching goal of cognitive science of creating a unified theory of the human mind.

DESCRIPTION AND MEASUREMENT

Quantitative assessment of dimensions of personality is at the heart of the trait approach. Not only is the number of measures available to the personality researcher ever-increasing (Boyle, Saklofske & Matthews, 2015), but so too is the range and diversity of measurable constructs, encompassing idiographic traits, the unconscious, and aspects of personal narratives as previously noted. Personality assessment may seem a rather settled methodology, buttressed by the availability of standard instruments such as the NEO-PI-R (Costa & McCrae, 2008), widespread use of latent factor modeling (Ullman, 2006), and explicit standards for test validity (AERA, APA, NCME, 2014). Against this rosy picture, there is still no universal consensus among researchers on a definitive dimensional model of personality, especially at more granular levels, and significant controversies over leading scales remain (Boyle, 2008). There are also those who challenge the fundamental assumptions of psychometrics (Barrett, 2005), and the question of whether self-report scales should be treated as representational or operational remains unresolved (Matthews, De Winter & Hancock, 2019). Contributions to this section illustrate both the accomplishments and uncertainties of personality measurement.

Boyle and Helmes (Chapter 7) review leading multidimensional personality scales, including clinically focused instruments. In addition to a comparative review, these authors highlight various scale-design, procedural, and statistical issues that can profoundly influence measurement, and point out some of the pitfalls awaiting the would-be psychometrician. They emphasize the importance of advances in methodology for improving evidence-based assessment procedures. They also

highlight the unfulfilled potential of objective personality assessments as a target for future measurement efforts.

De Raad and Barelds' (Chapter 8) review of personality structure begins by differentiating the two principal strategies for developing dimensional models. The first is a top-down theoretically inspired approach exemplified by the psychobiological model of Hans Eysenck. The alternative, taxonomic approach is more data-driven and empirical, and can be traced to the initial work of Allport and Cattell. It also encompasses the lexical approach to personality, and its best known expression, the Five-Factor Model (FFM). De Raad and Barelds also explore additional structural approaches including hierarchical and circumplex models.

The FFM is characterized by McCrae (Chapter 9) as the dominant paradigm in personality research. His chapter covers both the accomplishments of research based on the FFM and critiques of the model. One objection is that the dimensions are descriptive rather than explanatory; McCrae's rebuttal refers to the biological bases for traits. A second class of objection comes from researchers who propose alternate dimensional models; a source of disagreement that may be resolved by hierarchical models. The chapter also reviews cross-cultural studies of the FFM.

Another longstanding measurement issue is the relationship between dimensions of personality and of cognitive ability, traditionally seen as separate domains. Schermer and Saklofske (Chapter 10) examine relationships between personality and intelligence. They review the modest linear associations found between aspects of the two types of construct, evidence from developmental studies, and the hypothesis that personality structure varies with intelligence. The chapter also considers explanatory models that may integrate personality and intelligence factors in the etiology of psychological disorders.

DEVELOPMENT, HEALTH AND CHANGE

Another fundamental issue is personality development over the lifespan. How do our personalities originate? How do they change over time? What psychological processes support development? Can we predict and shape individual differences in major life outcomes, such as physical and mental health?

Broadly, two rather different perspectives have been adopted historically. An essentialist position (see Haslam, Bastian & Bissett, 2004) supposes that individuals have a rather stable nature, evident early in childhood, which is perpetuated, with minor changes, throughout the lifespan. This position is compatible with a strong hereditary component to personality and a view that biology is destiny. Conversely, in the spirit of J. B. Watson, we may see personality as accumulating over time through significant learning experiences. Theories as various as psychoanalysis, traditional learning theory and modern social-cognitive theory have seen learning as central to personality development – accordingly, such approaches tend to suggest a more malleable view of personality. Understanding development breaks down into a number of discrete research issues, including measurement models for the lifespan, identifying qualitative differences between child and adult personality, modeling the processes that contribute to development, and linking personality development to the person's broader experience of life, wellbeing and health. Contributors to this volume address some of the key issues involved in stability and change.

The development of temperament and neural network is discussed in Rothbart, Posner and Sheese's (Chapter 11) review. Temperament is defined as individual differences in emotional and motor reactivity and attentional self-regulation. Studies of brain-imaging and molecular genetics are uncovering the individual differences in brain function that provide a platform for building on longitudinal studies of the development of temperament. This research may also inform network training interventions for attentional enhancement.

Atherton, Donnellan and Robins (Chapter 12) review evidence on stability and change in major traits across the lifespan. Beyond simple demonstrations of test-retest stability, the challenge is that personality development reflects dynamic transactions between the individual and social situations, rather than changes in isolated traits. Meeting this challenge requires several conceptually distinct types of stability and change, which may require different statistical approaches to analysis of longitudinal data. At a process level, three unique but complementary perspectives refer to intrinsic maturation, the social environment and self-reflection.

A critical issue for development is whether personality is associated with level of vulnerability to mental disorder or whether personality change is simply a concomitant of illness. Hakulinen, Jokela, Kivimäki and Elovainio (Chapter 13) address such issues in their review of personality traits and disorders. They find that traits, especially neuroticism, may, indeed, act as vulnerability factors for a range of disorders. However, there is also evidence for additional causal relationships between traits and symptoms of disorder, including the existence of common factors influencing personality and mental health, and personality change that represents a scar of the disorder.

Heilmayr and Friedman's (Chapter 14) review of personality and physical health complements the previous chapter, and arrives at similar conclusions. As for mental disorder, there is evidence from prospective data that traits are predictive of future health. In this case, the most salient trait is conscientiousness; its associations with better health appear to reflect multiple causal pathways, including individual differences in health behaviors. The authors recommend a dynamic biopsychosocial approach to better understand the various pathways influencing the interplay between personality and health across the lifespan.

The final chapter in this section, by Mikulincer and Shaver (Chapter 15), reviews attachment theory as an integrative approach that combines psychoanalytic, evolutionary, developmental, social-cognitive and personality trait constructs. The theory has generated validation of scales for measurement of attachment style, insights into how attachment style shapes adaptive and maladaptive social behaviors, and evidence on continuity of attachment patterns from infancy to adulthood. Future work may further integrate attachment theory with other theoretical perspectives in psychology, as well as investigating the gene-environment interactions associated with attachment style.

BIOLOGICAL PERSPECTIVES

According to the biological perspective, personality is a window on the brain. In their various ways, Hans Eysenck (1967) and Jeffrey Gray (1981) articulated the influential view that individual differences in simple but critical brain parameters, such as arousability and sensitivity to reinforcing stimuli, drive far-reaching personality changes, expressed in traits, such as extraversion and neuroticism. These theories emphasize the role of polymorphisms in genes for brain development in generating personality variation (in conjunction with environmental factors). As a broad research project, biological theory emphasizes studies of behavior and molecular genetics, psychophysiology, and the linkage between neuroscience and real-world behavioral functioning, including clinical disorder. It is also compatible with recent interest in how evolutionary genetic mechanisms may produce variation in traits across individuals (Penke & Jokela, 2016).

Both genetic and neuroscience studies of personality are advancing rapidly, especially with enhancements in measurement technology. The conclusion from conventional behavior genetic studies that around 50 percent of the variance in major personality traits is heritable is no longer controversial (Johnson, Vernon & Mackie, 2008). Current research focuses on important but subtler issues such as non-additive effects of genes, gene-environment interaction and epigenetic mechanisms (e.g., Gescher et al., 2018) Molecular genetic research demonstrates that polymorphisms of individual genes make only small contributions, but recent work is now demonstrating the potential of GWAS studies conducted on large data sets (Sanchez-Roige et al., 2018). At the same time, the likely complexity of mappings between genes, brain systems and behavior may present a barrier to future progress (Turkheimer, Pettersson & Horn, 2014) – or it may be seen as just another scientific problem to be addressed, and solved.

Contemporary brain-imaging methods are transforming personality neuroscience (Kennis, Rademaker & Geuze, 2013). Improving temporal and spatial resolution together with more powerful methods for modelling neural activity are likely to maintain the impetus. However, it remains to be seen whether the psychometric trait models based on questionnaire data will prove adequate to capture personality variation seen at the neural level. "Endophenotypes" – highly specific traits that are shaped by the genes – might provide a better or at least complementary unit of analysis for neuroscience theory (Smillie, 2008).

In the first chapter in this section, Lewis, Al-Shawaf and Buss (Chapter 16) make the case for evolutionary psychology as the foundational meta-theory for both personality and the broader field of psychology. They explain how a universal human nature shaped by evolution can produce individual differences. They identify multiple selective and non-selective evolutionary processes that may be responsible for personality trait variation. For future progress, they advocate studies of the computational architecture of evolved psychological mechanisms that control how individuals process situational cues when faced with an adaptive problem. Longitudinal studies are necessary to investigate how evolved mechanisms control personality stability and change.

From an evolutionary perspective, it would be surprising if personality was a uniquely human characteristic. Bell and Bensky (Chapter 17) review the evidence for personality variation in nonhuman animals. An advantage of studying animals is that genetic and environmental factors can be systematically manipulated in ways that are impossible in human personality studies. Researchers have overcome the challenges of working with nonhuman subjects to investigate dimensions of behavioral variation, their relationships with individual differences in cognition and social behaviors, and the developmental process. As with human research, molecular genetic studies may contribute to understanding the roots of inter-individual variation.

Current work on behavior and molecular genetics is reviewed by Sallis, Davey Smith and Munafò (Chapter 18). Although the heritability of personality traits is well-established, progress in specifying the genes responsible for personality has been slow. Heritability estimates from traditional twin studies have been complemented by alternative methods, such as analyses based on single nucleotide polymorphisms from GWAS studies of unrelated individuals. Somewhat provocatively, these analyses provide lower heritability estimates than traditional methods. GWAS studies also suggest that trait variation results from the combined small-magnitude effects of many individual genes. Future research may be able to use techniques including Mendelian randomization to test causal models.

The leading broad theoretical framework for the neuroscience of personality is provided by the family of approach-avoidance theories, reviewed by Corr and Krupić (Chapter 19). They describe the roots of these theories of personality in philosophy, psychology and neuroscience, as well as Reinforcement Sensitivity Theory as a specific example. Individual differences in three major neuropsychological systems mediate response to attractor ("appetitive") and repulsor ("aversive") stimuli. Theories of this kind, supported by neurophysiological and

behavioral evidence, provide a path toward truly explanatory models of major personality traits.

Personality neuroscience has emerged as a distinctive subfield of research, fueled in part by the explosion of functional and structural MRI studies of personality, complemented by advances in traditional psychophysiology and molecular genetics. DeYoung and Blain (Chapter 20) review the state of the science, focusing initially on methodological issues. The field has advanced sufficiently that a neuroscience account of each of the Big Five traits can be presented. Studies at different levels of granularity may contribute to advancing explanatory models of traits based on neuroscience.

COGNITIVE AND MOTIVATIONAL PERSPECTIVES

Cognitive-psychological research on personality has traded quite successfully on the insights and methods of the "cognitive revolution" of the 1960s. Major themes include the importance of stable self-knowledge, studies of information-processing using objective performance indices, and self-regulation as an element of dynamic interaction between the person and the outside world (Matthews, 2008). Theoretical landmarks include schema theories of emotional pathology (Beck, Emery & Greenberg, 2005), information-processing accounts of anxiety and impulsivity (Eysenck & Derakshan, 2011; Revelle, 1993) and the cybernetics of self-regulation which integrates cognitive with motivational perspectives (Carver & Scheier, 1998).

As in other realms of personality, these well-established theories face new challenges, one of which is the extent to which elements of personality, including emotion, values, and unconscious processes can be reduced to cognition. Cognitive science theory (Matthews, 2004a, 2018) provides a possible resolution: "Cognition" has different meanings at different levels of explanation. The utility of cognitive and motivational approaches as explanatory models is also open to debate. Information-processing models typically establish correlations between traits and multifarious processing components (Matthews, 2008), but it remains unclear whether processing causes personality or vice versa. Recent work on anxiety (Grafton et al., 2017) establishes a causal role for processing: training participants to respond to threat stimuli appears to increase anxiety (stress vulnerability). At the same time, trait anxiety relates to processing biases and strategic preferences that influence cognitions of threat. Self-regulative theories may be usefully extended by specifying reciprocal relationships between personality traits and specific processing functions that support adaptation to external social environments (Matthews, 2016).

The common element of the chapters in this section is a concern with cognitive and motivational process models that complement structural models of personality. Matthews (Chapter 21) provides an overview of cognitive-process studies utilizing objective performance measures for a variety of purposes. The chapter also outlines the Cognitive–Adaptive Theory of Traits that integrates the differing explanatory perspectives of cognitive science. Traits may derive coherence from their basis in multiple processes that support common adaptive goals.

Carver and Scheier (Chapter 22) review self-regulative theory and its relevance to personality. They specify control processes that support feedback-based regulation of goal-directed behavior and accompanying affect. Priority management as the person pursues multiple goals may be an important feature of personality. The chapter also considers self-regulative perspectives on impulsivity and self-control, and their neurological bases. Recent work suggests that individual differences in impulsive responses to emotion may underpin a transdiagnostic vulnerability factor for multiple forms of pathology.

Szalma (Chapter 23) addresses need theories and their contribution to understanding the inter-relationships of cognition, motivation and personality. Modern needs theories, especially self-determination theory, identify psychosocial needs that may vary across individuals, as both states and traits. Major personality traits may be associated with a "motivational patterning" of needs analogous to the cognitive patternings identified in performance studies. This perspective enhances the explanatory power of both cognitive science and self-regulative accounts of personality.

The self is a fundamental but protean construct that has come to psychology by way of philosophy, theology and introspection. Robinson and Sedikides (Chapter 24) describe the prospects for resolving the tension between social-psychological and trait-based perspectives on the self. Research has addressed generalized self-beliefs, processes including self-verification, and motives such as self-enhancement. A dynamic account of personality functioning that recognizes stability and change in motivational and cognitive processes may integrate the self and personality literatures.

Jayawickreme and Zachry (Chapter 25) also call attention to diverging structural and process-based perspectives. They review dynamic theories, including Whole Trait Theory, that focus on the origins of individual difference factors (e.g., in traits, goals, values), their manifestations in daily lives, and their personal, social, occupational and societal consequences. Such theories draw on both accounts of social-cognitive processes and the stabilities emphasized in trait theory, including the frequency with which individuals perform trait-relevant behaviors.

Eysenck and Holmes (Chapter 26) review relationships between anxiety, depression and cognitive dysfunction, drawing on research from both normal and clinical populations. Anxiety and depression are related to a range of biases in attention, memory and interpretation, varying somewhat with the affective condition concerned. Personality-cognition relationships are likely to be bidirectional. Deficits in executive control may, in part,

mediate associations between traits for negative emotions and cognitive bias. Conversely, mitigation of bias may alleviate emotional vulnerabilities, although the magnitude of effects has not been conclusively determined.

SOCIAL AND CULTURAL PROCESSES

Traditional social psychological interpretations of personality face the issue that seemingly uniquely social aspects of personality may, in fact, be understood in terms of trait constructs and the individual's mental representations. Many core attributes of the self, such as self-esteem and self-efficacy, may be represented as generalized self-knowledge (Matthews et al., 2000). Empirical work elucidates the impact of stable biases in social knowledge and processes on individual differences in social behaviors and relationships (e.g., Landis, 2016). Such research is enriched by new lines of research as diverse as social neuroscience (Tamir & Thornton, 2018) and the role of personality in social media use (Liu & Campbell, 2017).

Research increasingly explores the wider cultural context of personality. The traditional argument is that culture shapes the social interactions which, in turn, shape the self and personality. This view continues to inform cross-cultural studies (Matsumoto, 2007) that investigate how contrasting social values, such as individualism and collectivism, are expressed in personality in cultures such as the USA and East Asia. At the same time, the cultural relativism traditionally promoted by anthropology has been challenged by the new awareness of universal human nature supported by evolutionary psychology and empirical evidence for, at least, some generality of personality structure (Fetvadjiev & van der Vijver, 2015). Chapters in this section review the convergence of personality and social-psychological perspectives on narrative identity, social functioning, cultural similarities and differences, and political psychology.

McLean, Syed, Haraldsson and Lowe (Chapter 27) explore recent work on narrative identity. Although narrative identity is more socially and culturally informed than traits, the sociocultural context can promote stability as well as malleability in identity. They describe master narratives derived from specific cultures that shape stability in individual storytelling. There may be individual differences in deviations from master narratives and in the extent to which narratives are internalized. Work on these issues may serve to marry a personality and cultural approach to narration.

Exploring the social expression of traits requires evidence that traits predict individual differences in social functioning. Austin, Knack, Jensen-Campbell and Rex-Lear (Chapter 28) begin their review of social relations and social support by presenting evidence of this kind. They go on to demonstrate that personality effects are not a one-way street. Relationships between personality, social relations and social support are bidirectional, and they are influenced by cultural context. New methodologies may be needed to understand better the causal relationships between personality and social constructs over the course of the lifespan.

Cross-cultural perspectives on personality are addressed by Draguns and Junko Tanaka-Matsumi (Chapter 29). Recent research has further fortified the evidence for the cross-cultural validity of overarching theoretical models, such as the FFM and basic values. At the same time, there is also new evidence on cross-cultural variation in traits, values, and conceptions of the self. Advances in both psychometric and ethnographic methods have contributed to a growing understanding of cultural factors. Future research may focus especially on developmental processes influenced by cultural traditions and the contemporary context of globalization and population movements.

Caprara and Vecchione (Chapter 30) point out that personality traits and values may be more influential in political behavior than traditional sociodemographic characteristics. In the political arena, personality has been treated both as a self-regulatory agentic system and a set of habitual behavioral tendencies. From a theoretical standpoint, the former perspective has been the more useful in understanding how traits, needs, motives, values and self-beliefs are related to ideological orientation and political engagement. Individual difference constructs are also relevant for understanding variation in political engagement and participation. Social-cognitive analyses provide constructs, such as value preferences and political self-efficacy, that contribute to personality theory in this context.

APPLICATIONS OF PERSONALITY PSYCHOLOGY

On the basis of Kurt Lewin's claim that "nothing is as practical as a good theory," we should anticipate that the progressing science of personality feeds into increasing practical application. Historically, personality trait assessment in fields, such as clinical, organizational and educational psychology has been somewhat controversial, mirroring the waxing and waning of the trait concept in basic psychology. The relevance of traits is now well-established due to meta-analyses establishing that major traits are reliably correlated with a range of consequential outcomes, such as job performance (Salgado, Anderson & Tauriz, 2015), educational attainment (Poropat, 2009) and a variety of clinical disorders (Kotov, Gamez, Schmidt & Watson, 2010). Indeed, DSM-5 recognizes dimensional trait models of psychopathology in parallel with traditional categorical descriptions of disorders (Crego, Gore, Rojas & Widiger, 2015). Traits also moderate humans' interactions with new technologies, such as unmanned vehicle operation, leading to human factors applications (Lin et al., 2019). Consistent with interactionism, the need to assess situational moderators to attain reliable prediction in applied settings is also established (Judge & Zapata, 2015). The evidence on the validity of traits in applied contexts supports enhancements in real-world

decision making, such as personnel selection (Lievens & Sackett, 2017) and choice of therapy for clinical patients (Lengel et al., 2016).

The credibility of the applied use of personality assessments is further bolstered by increasing sophistication of theory, referencing both psychobiological and social-cognitive processes (Matthews, Zeidner & Roberts, 2006). Occupational psychologists are increasingly attentive to the theoretical interpretations of associations between traits and organizational outcomes (Judge et al., 2013), and to cognitive, motivational and affective process mediating personality effects (e.g., Barrick, Mount & Li, 2013). Clinicians can use trait assessments not only for individual treatment planning, but also for understanding the time course of pathology and recovery, and facilitating the therapeutic alliance and treatment compliance (Bagby, Gralnick, Al-Dajani & Uliaszek, 2016). The trait approach is also compatible with the search for transdiagnostic abnormalities in cognitive and metacognitive processing that increase vulnerability to multiple disorders (Wells & Matthews, 2014), and are treatable using transdiagnostic therapies (Capobianco, Reeves, Morrison & Wells, 2018). Indeed, evidence for personality trait change during therapy suggests that personality could be explicitly targeted for interventions (Roberts et al., 2017).

Contributions to this section cover the well-established domains of clinical, organizational and educational psychology, as well as applications to criminology and to understanding economic behavior.

Personality research and its applications to work and organizations are reviewed by Salgado, Anderson and Moscoso (Chapter 31). Recent empirical studies have widened the focus of research from job performance as the principal outcome to include personality correlates of other important criteria, including organizational citizenship, leadership, counterproductive work behaviors and occupational health. While there remains a gap between important research findings and practice, the research base supports a range of applications for personnel selection.

Applications to educational psychology are reviewed by Ben-Eliyahu and Zeidner (Chapter 32). Research in this area has focused on individual differences in student achievement, motivation, emotional competencies and affective outcomes. Applications, such as enhancing learning, mitigating anxiety and supporting social-emotional development, have been shaped by multiple theoretical orientations. These include achievement motivation theory, accounts of intra-individual processes and contributions from the learning sciences, such as studies of self-regulated learning and learning context.

Clinical perspectives on personality are addressed by Widiger and McCabe (Chapter 33). A large body of research, including longitudinal studies, demonstrates relationships between major traits and a variety of clinically significant outcomes, including measures of psychopathology. The authors suggest that evaluating personality disorders on a dimensional basis, rather than as discrete categories, will improve diagnosis and treatment.

Lynam, Vize and Miller (Chapter 34) point out that criminology has rather neglected personality, to its detriment. They report a meta-analysis that identifies various FFM predictors of relevant criteria, including antisocial and aggressive behavior and sexual aggression. Different FFM profiles may characterize different types of antisocial behaviors associated with criminality. Research of this kind addresses broader criminological issues, such as the relative stability of offending, the role of personality in moderating situational influences on criminal behavior, and the psychological processes underpinning delinquency and criminal acts.

The final chapter by Ferguson, Zhao and Smillie (Chapter 35) addresses how personality can be integrated within the new field of behavioral economics. The authors review the role of traits in various economic processes and outcomes, including cooperation in micro-economic social interactions and macro-economic outcomes, such as job performance, entrepreneurialism and Gross Domestic Product. The emerging dialogue between personality psychologists and economists may support innovative perspectives on the links between personality traits, economic preferences and socioeconomics.

STATISTICS AND SOFTWARE FOR PERSONALITY RESEARCH

Personality researchers typically practice quantitative science and the data-processing methods available to them are rapidly advancing. Revelle, Elleman and Hall's Addendum reviews open source statistical software suitable for analysis of the large scale data sets common in contemporary research. They focus especially on the R package and programming language, and its use for modern analytic approaches to regression, latent factor modeling and tests for mediation and moderation. Less familiar analyses covered include within-subject analyses, computational modelling of processes, aggregation of data by geographic location and statistical learning algorithms. Their Appendix includes sample R code. We anticipate that it will provide a valuable resource for researchers.

CONCLUSION

We hope this handbook conveys the vigor and diversity of current personality research, expressed in its conceptual, methodological, theoretical and applied aspects. Together the chapters reinforce the message of the first edition of this book that understanding trait variation is essential across the various disciplines of psychological science, including neuroscience, cognitive psychology and social psychology. Many of the chapters support the value of personality traits as a focus for an integrated approach to assessment, theory and practice. However, an important

development is increased interest in integrating trait models with additional perspectives from approaches, such as evolutionary psychology, social-cognitive theory and personological accounts. Consistent with integrative goals, there is also growing recognition of the multilayered nature of personality, expressed in individual differences in neural functioning, in cognition and information-processing, and in social relationships. We believe that the chapters in this book point the way toward the objective of adopting a true synthesis of the multiple variants of personality theory.

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