Theory: State of the Art Review [Invited Paper]

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Personality Dynamics

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Abstract

Traditionally, personality psychology has been understood as the study of stability in people's dispositions. However, a different strand of personality research has highlighted the importance of acknowledging and explaining the meaningful intraindividual variation in human thoughts, feelings, and behavior across different contexts and time. The goal of this paper is to review this strand, highlight current research, and outline key questions for future research. We summarize historical perspectives on the dynamic processes underlying the emergence of personality within and across individuals (e.g. the pioneering theorizing of Allport; the person-situation debate), recent theoretical and empirical advances in incorporating dynamic processes into the definition and assessment of personality (e.g., the study of personality states; dynamic approaches to personality including Cognitive Affective Personality System [CAPS], Whole Trait Theory, the Knowledge-and-Appraisal Personality Architecture [KAPA] framework, and Nonlinear Interaction of Person and Situation [NIPS]), and new directions in current research (e.g. idiographic approaches; understanding variability in narrative identity). We end with suggestions for future research.

Keywords

> **Relevance Statement**
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> Acknowledging and explaining variation in behavior is vital to explaining the origins of personality. We provide a historical overview of dynamic personality approaches, summarize key theories, and outline some suggestions for future research.
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> **Key Insights**
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> - Personality psychology has historically focused on the stability of people's dispositions.
> - New perspectives acknowledge the importance of intraindividual variation in behavior.
> - We review the history of these perspectives, which go back to Allport.
> - We provide a selective summary of key approaches.
> - We end with suggestions for future research.

In the quest for exhaustive, yet parsimonious descriptions of ways in which individuals can differ psychologically from each other, personality psychology has often focused on *personality structure*; the organization of dimensions of inter-individual differences that are relatively stable. Yet across situations and time, thoughts, feelings, motivation, and behavior vary within individuals in meaningful ways, and a complete understanding of people's characteristic patterns of thoughts, feelings and behaviors is impossible without taking account of these dynamics (Baumert et al., 2017). Accordingly, the study of personality dynamics emphasizes both the description and explanation of personality as key goals of personality science (Mõttus et al., 2020). The study of personality dynamics also includes interest in personality change and development, as short-term changes in specific patterns may come to persist over time and as personality processes unfold over the lifespan.

In this brief review, we describe recent developments in the study of personality dynamics, highlight current research, and outline key questions for future examination. Specifically, we summarize historical perspectives on the dynamic processes underlying the emergence of personality within and across individuals, recent theoretical and empirical advances in incorporating dynamic processes into the definition and assessment of personality, and new directions in current research (e.g., idiographic approaches; assessment of situations and goals; understanding variability in narrative identity). We end with suggestions for future research.

Early Conceptualizations

From its beginnings, personality set out to answer two types of questions. *Nomothetic approaches* originally sought to differentiate populations of individuals on shared

characteristics. Moreover, researchers have now highlighted the critical importance of identifying common processes underlying these characteristics (Blum et al., 2021); in other words, understanding the dynamic processes underlying individual differences. In addition, *idiographic approaches* focused on understanding the dynamics of individuals, and the extent to which these dynamics differ from person to person.

Allport's Theoretical Foundations

Early work by Gordon Allport laid the theoretical groundwork for personality psychology in the 20th century. To Allport, personality traits were both idiographic and nomothetic, and Allport made important contributions to the study of each. Allport's early work on the lexical hypothesis, for example (Allport & Odbert, 1936), remains the foundation of nearly a century of research on personality trait structure. Essentially, the lexical hypothesis argued that individual differences are represented in the language used to describe others. While Allport was predominantly a proponent of idiographic approaches, he nevertheless advocated for nomothetic approaches based on their utility, like differentiating people from one another and using such differences for prediction.

To Allport, "true" traits were idiographic, and he defined personality as "the dynamic organization within the individual of those psychophysical systems that determine his [sic] unique adjustments to his [sic] environment" (Allport, 1937, p. 48). Such an approach also allows for investigations into how the whole person changes in a dynamic fashion throughout the lifespan. In summary, personality was not seen as a static organization, but as a dynamic one that reflected changes in environments and across the lifespan.

Cattell's Statistical Foundations

Cattell (1946) pioneered corollary measurement and modeling contributions. He conducted foundational work on factor analysis and proffered a data box (Cattell, 1946) that underscored the measurement and modeling of personality both between- and within-person and across situations and time. Cattell (1946) distinguished between three dimensions of measurement that indexed people (P_1 to P_n), variables (X_1 to X_p), and occasions or time (T_1 to T_t)[1]. The questions a given study asked and answered depended on how the researcher divided up the data box, with nomothetic questions focusing on the person and variable dimensions, aggregating across the occasion dimension (*R-technique*). Focusing on the variable and occasion dimensions and fixing or dividing the person dimension answers more dynamic idiographic questions (*P-technique*). Cattell and Scheier (1961, p. 153), however, expected that the processes underlying individual

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1) While Cattell collapsed these dimensions in his work, we suggest that it is important to keep these as separate dimensions.

within-person structures would likely be shared across most individuals (see Mneimne et al., 2021, for further discussion).

Structure Versus Dynamics: The Person-Situation Debate

An enduring debate in psychology has concerned the relative power of persons and situations in predicting behavior (Fleeson & Jayawickreme, 2015). This tension between the power of personality and the power of situations came to a head during the so-called "Person-Situation Debate." In his seminal book, Mischel (1968) argued that situations were critically important in understanding and predicting behavior. He argued that a "personality coefficient" of .3, or the limit of the personality-behavior relationship between in the literature, meant 1) personality traits did not predict *behavior* that well and 2) that variability must thus not be due persons but rather to other factors. Ultimately, the Person-Situation Debate led many researchers to discount the utility of personality, looking instaed to other factors to account for the rich variability in behaviors exhibited within and across people. However, Mischel asserted that personality was never meant to be a study of generalized between-person characteristics, but rather of persons, their construals of situations, and the dynamic interplay between them. Nevertheless, Mischel's critique and the Person-Situation Debate more broadly led personality researchers to seriously consider the question of how person and situational factors could be best integrated to provide a complete account of the person (Fleeson & Jayawickreme, 2015).

Post-Debate Advances

Following the Person-Situation Debate, interest increased in approaches focused on examining the variance in thoughts, feelings, and behavior within persons. These approaches, which are generally lumped under the category of social cognitive approaches to personality, remain the underpinning of many more modern frameworks, like those covered below. From a social cognitive perspective, consistency in behavior was not be expected. Instead, how behaviors varied within a person across situations were meaningful profiles of individual differences themselves, with, for example, some people feeling anxiety in a particular context, but not another. Thus, social cognitive approaches defined personality as typical responses (behaviors, emotions, motivation, etc.) within a context – or behavioral signatures (Fournier et al., 2009) – rather than as average, typical responses across contexts as in a nomothetic perspective. This review is necessarily selective in the interests of brevity (see Kuper et al., 2021, for a more expansive review).

Cognitive Affective Personality System (CAPS)

Nearly three decades after Mischel (1968) sparked the Person-Situation Debate, Mischel and Shoda (1995) expanded their initial work on cognitive social learning models and

conditional approaches to personality to the Cognitive Affective Personality System (CAPS). Rather than objective features of situations (e.g., social situation with peers), CAPS focuses on their psychological features, which are associated with *cognitive affective processing units* (CAUs), including encodings, expectancies and beliefs, affect, goals and values, and competencies. Different cognitive-affective unfold in a complex system in which components dynamically interact.

The CAPS model has several distinguishing features. First, the CAPS models accounts for equifinality of behaviors by including both situation construals and cognitive-affective units. Second, the CAPS model includes multiple sources of variability, including feedback loops among situations, CAUs, and behavior. Finally, the CAPS model highlights several ways in interindividual differences in processes arise – in construals of situations, in construal-CAU relationships, and in how CAUs interact to produce behavior (in other words, people differ in their *if-then contingencies*, or situation-behavior relationships; Wright & Mischel, 1987). As a result, the CAPS model highlights the complexity of the individual and the cascading effects of such complexity, which suggests it makes little sense to build a science of personality based at the population level.

Knowledge and Appraisal Framework (KAPA)

While the CAPS model provides a useful framework for thinking about personality dynamics, Cervone's (2005) Knowledge-and-Appraisal Personality Architecture (KAPA) offered a further differentiation of the levels at which personality could be studied dynamically. The KAPA framework proposes that personality can be understood in terms of an "architecture" that consists of both enduring knowledge structures and dynamic cognitive and affective appraisal processes. This framework has several key features. First, it delineates definitions within personality that had previously obfuscated distinctions between structure and dynamics. That is, the term "structure" has been often employed in different ways, being used to describe both stable patterns within an individual that explain their patterns of behaviors and experiences as well as the organization of dimensions of relatively stable individual differences in a population. Second, like Allport's approach, the KAPA system argues that the causal forces of personality are in within-person structures that explain an individual's behaviors and experiences, while between-person structures taxonomically differentiate dimensions of individual differences at the population level. Third, the KAPA system outlines approaches for capturing within-person structures which is understudied relative to between-person structures (Cervone, 2005). Personality structures are complex dynamic processing systems in which the interactions among the elements of the system are more important than any given unit.

KAPA also distinguishes between structure and process. Specifically, the structure of such systems reflects knowledge, while the processes reflect appraisals, both of which are impacted by affect and reactivity. Individuals have huge stores of knowledge,

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subsets of which are available at given times and whose accessibility is an individual difference that guides and shapes appraisal processes reciprocally. The KAPA framework directly incorporates cross-situational variability and coherence, clearly articulating how to capture components of the KAPA framework using observational, experimental, and theoretical approaches.

Whole Trait Theory

Both the CAPS model and the KAPA framework assume that it was unlikely that behavior would be consistent across contexts or situations. One limitation of the early approaches, however, was that they subsequently did not engage with ongoing work in clarifying the structure of personality, especially perspectives focused on the domain of broad, dispositional traits. Whole Trait Theory attempts to reconcile social cognitive and broad trait approaches by integrating them into a distinctive understanding of what constitutes a trait. It does so by clarifying the distinction between the *descriptive* and *explanatory* features of personality. On this view, traits consist of two components or "sides" (Fleeson & Jayawickreme, 2015) – the explanatory component (*TraitEXP*) consisting of dynamic social-cognitive processes causing trait manifestations, and the descriptive component of traits (*TraitDES*), which are manifestations of personality traits (or personality *states*; Fleeson, 2001) that both vary across context and form stable distributions over time as a function of the dynamic processes characterized by *TraitEXP*.

According to Whole Trait Theory, *TraitDES* is conceptualized as *density distributions of personality states* (Fleeson, 2001). People differ in their central tendency of these distributions, and this difference explains both observed differences between people as well as the predictive power of personality for major life outcomes. However, Whole Trait Theory also holds that variability in people's state manifestations is meaningful. Individuals are motivated by goals and respond to characteristics of their situation to vary their manifestation of states. These states are determined by social-cognitive mechanisms (Fleeson & Jayawickreme, 2015; Jayawickreme et al., 2019).

The central claim of Whole Trait Theory is that it provides an explanatory account for the manifestations of broad traits such as the Big Five in daily life. For example, if *TraitDES* represents the Big Five and *TraitEXP* represents social cognitive mechanisms, then social-cognitive mechanisms imply the Big Five and the Big Five imply social cognitive mechanisms. This can be tested by showing that manifestations of the Big Five have characteristics of something producible by social-cognitive mechanisms and compatible with consistency, and that social-cognitive mechanisms produce Big Five manifestations. In support of this prediction, Read and colleagues (2010) have shown how neural network models can both generate Big Five structure and capture the dynamic features of personality manifestations from organized approach and avoidance motivational systems that correspond with situation features and affordances.

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On this view, people vary their thoughts, feelings and behavior when individuals are motivated both internally by their goals, beliefs, and identities, and externally by their situation to change their state manifestation. For example, the change in states may lead to positive outcomes (e.g., making friends in response to extraverted behavior), which in turn leads to reinforcements of those manifestations and possibly long-term changes (Fleeson & Jayawickreme, 2015). Such changes in the links between processes represents associative processes. In this way, personality change at the *TraitEXP* level occurs as a result of many micro processes attendant upon environmental responses to manifested states (e.g., *TraitDES*).

The Nonlinear Interaction of Person and Situation (NIPS) Model

Similar to Whole Trait Theory, the Nonlinear Interaction of Person and Situation (NIPS) Model (Blum et al., 2021) provides a formalized account of how person and situation characteristics interact in shaping behavior. The NIPS model conceptualizes behavior as having lower and upper boundaries and proposes a nonlinear modeling approach using logistic functions. The model further distinguishes between four types of processes underlying behavior: activation, tendency, inhibition, and predictability. These processes modulate four different parameters of the logistic curve.

This model further encompasses the concepts of "strong" and "weak" situations by proposing that at the extremes of the situation dimensions (situational presses or affordances, e.g., threat), situations are the primary determinant of behavior, whereas in moderate situations personality trait differences (e.g., trait anxiety) are the primary determinants of behavior (e.g., fleeing). In turn, the NIPS model also proposes that persons differ in their sensitivity to situational forces, and that consequently some people show less variability in behavior than others. For example, some persons always flee, or never flee, independent of threat level, while other persons show great variability in their behavior across situations. Thus, intraindividual variability is predicted to be smaller at the extremes of personality dimensions than in middle ranges.

Furthermore, the NIPS model incorporates synergetic and compensatory shapes of interaction, thereby offering ways to account for seemingly contradictory findings in the literature. Specifically, the NIPS predicts that person and situation interact in *synergetic* ways at the lower ends of the person and situation continua. This means that increases in the level of the trait enhance the effect of the situation characteristic on behavior, and vice versa. However, towards the upper extreme of the continua, this pattern should shift to a *compensatory* interaction, where increases in the person characteristic will have greater effects on behavior in less extreme situations. Additionally, increases in the situation characteristic would have greater effects on behavior at less extreme levels of the person characteristic. The NIPS is applicable to any dimension of variability in human behavior, it emphasizes that characteristics of persons and situations can be functionally equivalent so that they jointly shape behavior, and it offers precise (formal-

ized) predictions regarding the shape of interaction. However, the NIPS model (and its extension) are less concerned with how individuals seek out and change the situations they encounter and with the mechanisms of person-situation transaction that should be relevant for a complete understanding of inter-individual differences in intraindividual variability.

Process Models of Personality Development

To better understand processes of personality development, some have begun investigating the links between short-term, intraindividual dynamics and longitudinal changes across time, especially in the domain of dispositional traits. For example, Borghuis et al. (2020) found that adolescents' daily negative affect assessed across shorter periods of time (i.e., five consecutive days) predicted subsequent increases in self-reported neuroticism across a year, and vice versa. In adolescence and young adulthood, Wrzus et al. (2021) additionally showed that changes in intraindividual contingencies between experienced hassles and negative affect (measured across weeks) predicted changes in neuroticism (across years).

While such empirical studies are still rare (due to methodological challenges), new theoretical models detail the (changes in) situational constellations and states or processes through which development occurs. For example, the (revised) sociogenomic model of personality (Roberts, 2018) highlights that experiences can cause enduring changes to individual patterns of thoughts, feelings, and behavior, either through epigenetic mechanisms (changed biological processes of DNA expression), or when environmental changes lead to new patterns of states. Additional frameworks detail how state changes come to persist over time and what processes could be involved in translating changes in patterns of experiences into personality changes. The TESSERA (Triggering situations, Expectancy, States/State expressions, and Reactions) framework (Wrzus & Roberts, 2017) proposes that repeated recursive sequences of situational constellations that trigger expectancies, momentary thoughts, feelings, and behaviors, together with own and others' reactions to such states can feed into changing personality traits through learning or self-reflective mechanisms. This framework shares with Whole Trait Theory the focus on state manifestations for long-term personality change. Geukes et al. (2017) have further differentiated between three state domains—goals and strategies, actions and experiences, and evaluations and reflections. They have proposed that relatively stable interindividual differences exist in how these processes unfold as well as in how strongly states within and across domains are intra-individually connected. Relatedly, we note that a common theme across the theoretical frameworks discussed in this review is the focus on motives and goals, how they change in response to the situation, behaviors of others, and their own behavior, as well as identifying how between-individual differences in the importance or priority of goals are central to identifying stable, between-individual differences.

McAdams' Three-Domain Framework

McAdams (1995) developed a framework for organizing the study of personality into three domains: dispositional traits (generalized, decontextualized characteristics of persons), characteristic adaptations (personal concerns such as motives, goals, strivings and plans), and narrative identity (the internalized, developing story of the self that integrates the reconstructed past, the perceived present, and the imagined future). As such, the framework is inclusive and introduces dynamic interrelations between domains. In addition, each of the three domains also has its own distinctive characteristics and dynamics. McAdams' framework has been highly generative for the field, invigorating scholarship that seeks to investigate the ways in which different aspects of personality emerge, develop, and interact over time (e.g., Bühler et al., 2020) and for understanding holistic personality development (e.g., McAdams & West, 1997). For example, thematic aspects of narrative identity develop alongside, but in empirically separable ways from, dispositional traits (Adler et al., 2016; McLean et al., 2020).

Furthermore, since McAdams' (1985) introduction of the construct of narrative identity, a robust literature has examined the structure and dynamics of this domain. In a recent review, Pasupathi and Adler (2021) described the relationship between the *life story framework*, which prioritizes the structural aspects of narrative identity, and the *situated narration framework*, which prioritizes the processes and contexts that shape narrative identity development. The building blocks of narrative identity are scaffolded in childhood through parent-child reminiscing -- shared storytelling about life events (e.g., Nelson & Fivush, 2004). In adolescence and adulthood, the process of self-narration unfolds in interpersonal and cultural contexts that influence the production and storage of autobiographical memories (e.g., McLean & Syed, 2015). In summary, unique insights into personality dynamics can be obtained from personological approaches that examine the reciprocal, dynamic relationships within and between the three domains of personality over time.

New Directions

The past several decades have seen considerable theoretical and methodological advances within the field as a whole. Theoretically, each of the models and theories outlined in the previous section continue to guide thinking on personality today. Methodologically, the current study of personality builds upon continuing technological advances that make the assessment of personality and its manifestations, including behaviors, emotions, beliefs, and values, among others, easier, less invasive, more precise, and more ecologically valid. Together, these theoretical advances, coupled with improved technology, have paved the way for some of the most promising modern approaches to personality dynamics. We briefly review a select number of these innovations below, which include

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new directions in assessing narrative identity, studying personality idiographically, and utilizing a myriad of new measurement and modeling techniques.

New Directions in Examining Dynamics in Narrative Identity

Studies of variation in narrative identity have typically prioritized inter-individual differences in the thematic qualities of personal narratives (Adler et al., 2016). Examining life stories themes is one way of operationalizing the meaning-making endeavor of autobiographical reasoning at the core of narrative identity development, and provides one important method for understanding how whole persons change dynamically over time. Researchers have produced a set of guidelines for conducting quantitative research focused on narrative identity (Adler et al., 2017) and two recent reviews, one narrative (Adler et al., 2016) and one quantitative (McLean et al., 2020), provide an overview of the central themes that have been examined. These insights have, in turn, raised new questions for future work. We highlight below one such opportunity (among many) for future scholarship.

Although the study of narrative identity has drawn from the study of dispositional traits in many ways, there are fundamental ways in which narrative identity is different from traits (McLean et al., 2020). Indeed, recent work has strived to demonstrate the complexity in operationalizing stability and change in narrative identity (Adler, 2019). For example, if an individual tells the story of the same life experience as their low point narrative in response to prompts on two Life Story Interviews conducted several years apart, is that evidence of identity stability, or might it instead be understood as a failure of development, or stagnant change? Or, if the content of these two stories changes, but the thematic content (for example, themes of agency and communion) are similar, does that indicate a different developmental process? Pursuing definitions of stability and change in narrative identity will require more exploratory and descriptive research in developing grounded theories of these processes.

Re-Emerging Idiographic Approaches

In the last decade, bolstered by the rise of smartphone data, a number of researchers have begun to advocate for a returning emphasis on idiographic approaches to personality to understand personality structure, dynamics, and development (e.g., Beck & Jackson, 2020; Mneimne et al., 2021). Such approaches complement the qualitative narrative approaches with quantitative modelling approaches to understanding individuals (e.g., Adler et al., 2017). In these accounts, personality is defined by understanding both how individuals differ from one another (variable-centered, nomothetically) as well as individually in their own right (person-centered, idiographically). Modern idiographic approaches emphasize the dynamic nature of understanding a person, arguing that idiographic personality is best considered a dynamic system.

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Today, idiographic approaches address three main questions concerning the units of personality, their relationship to one another, and how such relationships unfold over time. First, because persons are considered only relative to themselves, defining what these "units" of personality are is the core challenge of idiographic approaches. Specifically, *P*-technique factor analyses of individual participant data (as opposed to *R*-technique factor analyses of between-person data) find that idiographic personality structures may not always align with between-person structures (Beck & Jackson, 2020; Borkenau & Ostendorf, 1998; Molenaar, 2004), which underscores the need to look beyond typical nomothetic dimensions to capture other, idiosyncratic individual difference dimensions. Only with recent work by Mneimne et al. (2021) and Beck & Jackson (2020) do we have the first evidence that heterogeneity is more than expected from error.

Second, once units are defined, understanding them as a system requires capturing the relationships among its elements, including bidirectional relationships within and across time, as well as patterns that may have important properties in their own right (Beck & Jackson, 2020). The simplest procedure is contemporaneous or lagged correlations among idiographic constructs. But new techniques, such as the Group Iterated Multiple Model Estimation (GIMME; Lane et al., 2019) extend basic correlation approaches using automatic individual model selection. Investigations using such models have demonstrated person-specific processes in the interplay of personality and psychopathology (Wright et al., 2019) and longitudinal consistency of idiographic personality (Beck & Jackson, 2020).

Third, idiographic approaches highlight the role of time in personality. Recently, emergence has become a popular link between within- and between-person models (Baumert et al., 2017). Essentially, emergence is an observable outcome of interactions among components in a complex system. In personality, this means that observed between-person differences on a personality dimension are an emergent property of relationships among within-person state manifestations. The temporal relationships among states (i.e., how indicators of states unfold together over time) has direct implications for the frequency and duration of personality state manifestations (Revelle & Condon, 2015). For example, an individual high in trait neuroticism is not always anxious, but tends to be so in more situations, to experience anxiety faster in such situations, and to see state anxiety reduce much more slowly. Indeed, the observation that average levels of personality state manifestations tend to correspond to between-person trait levels (Fleeson, 2001) underscores this and highlights that nomothetic and idiographic approaches should be considered as complementary approaches, with idiographic patterns underlying nomothetic ones.

Parallel Distributed Processing

A particularly promising approach for examining personality dynamics is represented in models of parallel distributed processing (PDP; also known as artificial neural networks).

Although PDP was first introduced over 30 years ago, with the exception of an excellent model by Read and colleagues (2010), it has not yet deeply penetrated into personality psychology. PDP models start by postulating networks of interconnected nodes, with each node assigned to a psychological concept (e.g., belief, emotion, desire, or behavior). Activation is received by input nodes from the environment, and then spreads across connected nodes. This spread of activation represents processing of information and is distributed across multiple nodes in parallel. Eventually, activation reaches multiple potential output nodes (e.g., a behavioral response); the output node with the strongest total activation will be enacted.

Consider a person entering a conversation among acquaintances. The person might notice a smiling glance by one of the others in the midst of an on-going conversation, they might see an empty chair, and they might wonder whether they were late. These nodes will activate other connected nodes, such as remembering when someone entered a meeting late last week, expectations that politeness requires greeting upon entering a room, shyness about drawing attention, and lingering sadness from an earlier email they had read. These distributed activations will eventually activate multiple possible responses, including saying "hello", quietly sitting in the empty chair, and trying to jump into the on-going conversation as soon as possible, among many others. The response with the greatest activation will be the one that the person enacts.

Read and colleagues (2010) have elaborated a PDP model for personality. Their model includes relatively powerful parameter nodes of approach and avoidance. These nodes provide coherence to responses in a way that mirrors traits, yet shows the dynamics underlying those traits. This model deserves attention from researchers interested in dynamics, as it can provide insights into how trait dimensions can emerge from dynamic processes.

Complexity and Simplicity in Analytic Technique

Complex dynamics and their conceptualizations often require complex statistical models to represent them, such as multi-level modeling (MLM), multi-level confirmatory factor analysis (Ml-CFA), structural equation modeling (SEM), PDP, and group iterative multiple model estimation (GIMME), network analyses, time-series, spectral analyses, and surface modelling. Several features of dynamic approaches make complex statistical models attractive. Most dynamic models employ multiple levels of analysis at once (at least between-person and within-person) and conceptualize multiple types of cross-level variations. They are typically multivariate (including multiple causes, multiple effects, correlations between causes, and correlations between effects), are often non-linear (curvilinear, step, decay, or cyclic), and embrace temporality (autoregression, time-dependency, and cycles).

However, there are challenges in utilizing these complex models, which arise from two sources. First, personality dynamics are already difficult to understand, on their own,

conceptually, so adding complex statistical models to the task will make dynamics even more difficult. For example, something as simple as the difference between between-person variance and within-person variance is subtly difficult. The fact that one refers to differences between people in average levels and the other refers to differences within a single person over time is hard to keep in mind. The implications of this for understanding psychological processes are still harder to keep straight. Then, when combining the two, such as considering between-person variation in within-person variation, it is even harder to be sure of what this means. Thus, because the conceptualizations are very complex and difficult, complex statistics only add to the chance for confusion and error. Statistics should facilitate conceptualization, not mystify it, yet complex statistics can create the dangers of confusion and error, and further distract from the main theoretical issues at hand. Of course, there may be specific issues that simply are not amenable to the use of the simplest statistical techniques, because using them may provide incomplete, incorrect or even misleading results.

A second source of danger is that many statistical models provide abstract, comprehensive, and general accounts of complex phenomena rather than specific, focused, and detailed accounts. For example, they may produce an overall fit of a model with many components and parameters, but not provide clear information about each moving part. These models attempt to provide a single model to describe a whole system, and then try to explicate the whole system at once. The downside is that details receive less focus.

These two problems can have multiple unfortunate consequences for research on personality dynamics. Complex statistics may ironically outstrip progress in understanding of the phenomena[2]. This could lead to misunderstandings of the implications or even inaccurate conclusions. Most importantly, complex statistics may interfere with the assessment of the conceptual and practical implications of the findings. Even more prone to error will be the connection of the current findings to other theories and conceptualizations. Ultimately, this problem could lead to isolation of the field of personality dynamics, slowing of penetration into the broader field, and inaccurate understanding of personality dynamics. Following the principle of parsimony, we believe that by extension theoretical models should equally strive to be a simple as feasible and should be expressed in the simplest possible language.

We therefore encourage scholars to engage the excitement of using new techniques and new, creative uses of old techniques. At the same time, we also recommend they use the simplest techniques possible; resisting the urge to reflexively turn to increasingly complex models, and to question the assumption that more complex equals better. We recommend that researchers always spell out the connection of the models to the conceptualization in detail, being sure to understand and articulate the conceptual

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2) This is a three-user problem: Investigators, readers, and reviewers may all lose sight of conceptualization when employing complex statistical models.

connection and implications of each component of the model. We further recommend others not use more complicated analyses than required. For example, one may test each parameter and component of large models individually rather than only testing models as wholes. Importantly, whenever using complicated models, robustness checks of the findings with other statistical techniques are imperative. And finally, we implore researchers not to lose sight of the real people who are at the focus of their models. The pursuit of personality dynamics is ultimately in service of describing and explaining the complexity of individual lives in their social contexts. Intricate quantitative modeling techniques benefit from being presented alongside richly drawn qualitative case studies that illustrate their implications for individual people. The most sophisticated scholarship on personality dynamics will therefore aspire to represent the sophisticated real world it is attempting to study.

Conclusion

As we noted at the beginning of this article, personality psychology has often prioritized the study of personality structure. This focus has certainly led to substantive scientific accomplishments, which have included the development of the Big Five model, which represents a model of systematic and replicable science (Fleeson & Jayawickreme, 2015). There is now renewed interest in questions of why, how, when, and where personality differences originate, manifest in daily lives, and entail important personal, social, occupational, and societal consequences. We have reviewed current dynamic theories focused on explaining personality and outlined a series of future directions for further understanding personality dynamics. We are confident that the next generation of personality science research will move our field to new frontiers in the study of individual differences.

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