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Personality Assessment and Theory

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## Abstract

Personality assessment aims to describe systematic differences between people in affect, cognition, and behavior, across situations and over time, usually with a predictive end point in sight. These (operational) measurements are tied to underlying (latent) constructs, although their relationships are often not explicitly articulated. These relationships are not merely conceptual with little practical utility; instead, they go to the very heart of the validity of personality assessment. In our discussion of these matters, we consider two germane problems: the distinction between two major levels of explanation (surface traits and source processes); and, related to this issue, the different sources of variance that comprise what is contained in even the simplest forms of personality assessment. We attempt to resolve these problems with reference to generalisability theory, and we conclude with specific recommendations for a more sophisticated approach to personality assessment to move forward this important field of psychology.

## Introduction

The purpose of personality assessment is to provide descriptive (operational) measures of underlying (latent) constructs that account for systematic differences between people in affect, cognition, and behavior, sampled over time and across situations, and usually related to a specific outcome (e.g., occupational performance or everyday prediction of others' future behaviour). Related to this main aim of assessment is a second more theoretical one, namely to uncover the causal roots of observed individual differences, in neurological, psychological or social terms. From a scientific perspective, this second aim is just as important as the first one; however, in much of personality psychology that focusses on testing and assessment, it is seen as either unimportant or, at least, subsidiary to the main task at hand.

This chapter argues that, not only are both aims essential, but neglect of the causal question undermines the validity of personality assessment in general. To our scientific minds, the way forward in personality assessment is to acknowledge this fact, appreciate its implications, and to adopt new procedures to directly address it.

An obvious, but highly important, first point to make when considering the nature of personality assessment is that the operational *something* to be assessed is valid only in terms of underlying latent factors — only by understanding the true nature of these underlying constructs, and their separate influences on variance components, can we begin to have a chance of understanding the true nature of measured factors. Although far from easy in application, the bridging of this gulf is a major challenge facing personality assessment in particular, and personality psychology more generally.

To repeat a crucial point, this is not merely a conceptual matter. Even in applied areas of assessment (e.g., personnel selection), we need to know the nature of

*why* personality measures correlate with real-world outcomes (e.g., occupational success). Included among the answer to this *why* question will be consideration of both person and environmental factors, and their interactions, and influence of multiple sources of variance.

In this chapter, we discuss the importance of the theoretical bases of personality assessment, especially as it relates to ‘construct validity’ and the importance of a rigorous methodological model of assessment which takes into account different sources of variance that have theoretical meaning and should not be assigned to the residual term of ‘method variance’, and certainly not ‘error’. We conclude with specific recommendations for different forms of assessment that not only provide reliable measurement but also a deeper conceptual understanding and, thus, construct validity and generalization of results.

Firstly, we discuss the important distinction between two major levels of explanation: Surface traits and source processes. Subsequently, we relate these levels to differences sources of variance in trait ratings. In doing so, we base our discussion around the ‘Big-5’ descriptive model of personality.

#### Surface Traits and Causal Sources

The lexical terms that make up everyday conversation are highly descriptive of personality differences, and the lexical hypothesis provides a rationale for this fact. We use such terms not only to describe but also to understand and predict future behaviour.

As is well known, the lexical hypothesis originated with the English Victorian polymath, Sir Francis Galton, and was later developed by Allport and Odbert (1936), Tupes and Christal (1958), Norman (1963) and Goldberg (1981). It is defined by descriptive markers (Goldberg, 1992) and was developed by empirically identifying

factors within common-language descriptors of persons (Goldberg, 1993; Saucier & Goldberg, 2001). Exploratory factor analyses of English adjectives in the middle of the twentieth century converged on five factors: Extraversion, Neuroticism, Agreeableness, Conscientiousness, and Openness to Experience/Intellect. In one form or another, these factors are represented in all models of personality, even those not originally intended to measure them (Markon, Kruger & Watson, 2005). These factors are not merely descriptive, but have predictive importance as shown by robust correlations with such outcomes as: mortality, divorce, occupational level (Roberts et al., 2007), work performance (Hurtz & Donovan, 2000), academic performance (Poropat, 2009, 2014a, 2014b), and psychiatric diagnosis (Gore & Widiger, 2013).

As description of variation at this surface population level, the Big-5 does an excellent job, but it should be obvious that a statistical account at this high level of abstraction is bound to be influenced by a broad range of factors, ranging from biological (DNA) to societal. In other words, there are likely to be many sources of influence on factor scores. It may be for this very reason that the ‘catch-all’ Big-5 factors are ubiquitous in personality research and have such wide-scale validity.

But, what this five-centric descriptive model singly fails to provide is information regarding the specific causal ‘sources’ of these surface traits. The lexical hypothesis claims that such natural language descriptive terms encode important social relations and, even assuming the validity of this claim, it does not add very much to our understanding of causal processes.

Scientific explanation looks for *reasons* for the existence of observed phenomena: for *causes*. In the case of personality traits, what we are observing at this surface level is the end product of a chain of (possibly highly complex) interacting

processes. Thus, to understand exactly what personality assessment is yielding we need to acknowledge this fact.

### Bridging the Operational-Latent Gap

As discussed in detail elsewhere (Poropat & Corr, 2015), there have been notable attempts to bridge the gap between descriptive and causal models of personality and it would be fair to say that these attempts have been less successful than initial hope suggested. Why should this be so? As Poropat and Corr (2015) noted, attempts to integrate models have been impaired by their different theoretical-epistemological starting points (Popple & Levi, 2000). Specifically, descriptive models have adopted a *between*-subjects, individual differences perspective that focusses on population-wide, higher-level, differences between people – this perspective is associated with the tradition of Sir Francis Galton. In (often stark) contrast, causal models have pursued a *within*-subjects perspective that examines the patterning of effects over time and across situations -- this perspective is associated with the experimental tradition of Wilhelm Wundt. The result of these traditions has been the production of models that are not readily commensurable.

Consider the ‘Big 5’ personality model in a little more detail. Recall that this model has been developed on the basis of factor analyses (Saucier, 2009) and this has been taken as confirmation of its reality, which has been further supported by the efficacy of its various measurement inventories for the prediction of criterion variables (Roberts et al., 2007). In contrast, causal models of personality (e.g., the reinforcement sensitivity theory, RST, of personality; Gray & McNaughton, 2000) start from an analysis of behavioural reactions to different situations; and, only then, is the attempt made to map systems identified with population-wide personality traits, for example behavioural inhibition and behavioural approach (Carver & White, 1994).



Before discussing these matters further, we note that the issues we discuss are long standing, and have been well rehearsed over the years by some notable psychologists – however, they have not yet been adequately addressed. For example, the late-great Hans Eysenck (1997) stated in his last journal article,

It is suggested that the scientific status of psychology is put in danger by the lack of paradigms in many of its fields, and by the failure to achieve unification, psychology is breaking up into many different disciplines. One important cause was suggested by Lee Cronbach...: the continuing failure of the two scientific disciplines of psychology – the experimental and the correlational – to come together and mutually support each other.

Well, what is the relevance of these considerations for personality assessment? Firstly, these issues have tended to be overlooked in the theoretical development of personality models, and especially in the building of different forms of personality assessment which, too often, are seen to stand apart from these more abstract theoretical issues. To repeat, operational measure is *about* latent constructs. Depending on theoretical-epistemological starting points, assessment will have different construct meanings: this is our key point in this chapter.

These conceptual issues are clearly important in interpreting the products of personality assessment. They are the grand theoretical backdrop to the next, more methodologically-focussed, issue we discuss: the role played by differences sources of variance.

## The Multifaceted Nature of Assessment

Personality psychology is challenged by the fact that both as a phenomenon (Andersen & Chen, 2002) and in assessment (Kenny & West, 2008) traits are essentially social — even when they are known to have a strong biological component. Important in this respect is the recognition that personality assessment yields measures that reflect both (a) raters, and (b) targets of their assessments. How can we use this knowledge to advance understanding of personality assessment?

Of significance is *generalisability theory* (Cronbach, 1957; Cronbach, Gleser, Nanda, & Rajaratnam, 1972; Cronbach, Rajaratnam, & Gleser, 1963) which offers an integrative framework for personality assessment. As suggested by Poropat and Corr (2015), the resolution to the Galtonian and Wundtian perspectives, discussed above, may come from this Cronbachian paradigm. In addition, this perspective addresses the different sources of ratings variance integral to personality assessment.

Generalisability theory provides a means of modelling the full range of influences in psychological assessment, which include sources related to: traits, targets, raters, contexts, measurement tools, and temporal factors. This approach is more than interactionism (Reynolds et al., 2010, for a recent consideration of this approach): It draws attention to the importance of personality *judgement* as much as the expression of personality in the target.

Everyday observation of other people's personality entails raters, or judges<sup>1</sup>. Outside formal testing situations, this is the most pervasive form of personality assessment. Empirical research confirms that, in their own right, such ratings have substantial validity in the prediction of criterion variables (Connelly & Ones, 2010; Poropat, 2014a, 2014b). Often times, the variance attributed to judges is assigned to

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<sup>1</sup> Many writers on psychological measurement prefer the term 'raters' (e.g., Lance, Dawson, Birkelbach, & Hoffman, 2010). We prefer to use 'judges' for the person who provides the rating and 'targets' for the person whose personality is being rated, in order to be consistent with Funder (2001).

method ‘error’ or ‘bias’ (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff, MacKenzie, & Podsakoff, 2012); however, it is known that these aspects of assessment can predict criterion-linked effects of greater magnitude than those associated with the purported traits being measured (Lance, Dawson, Birkelbach & Hoffman, 2010) — this is perhaps to be expected because judges have their own, often unique, perspective on target personalities.

### The Cronbachian Perspective

Now, in contrast to both the Galtonian and Wundtian perspectives, the Cronbachian paradigm assumes that *both* psychological phenomena and measurement types reflect multiple causal factors, and it is necessary to model these factors in order to provide a comprehensive personality model (Cronbach et al., 1972; Cronbach et al., 1963). This approach can be contrasted with the assumptions of classical test theory (CTT) which permeate many personality models – CTT assumes that observed scores ( $X$ ) reflect some underlying true score ( $T$ ) and a random error component ( $E$ ), as summarised by the well-known equation:

$$X = T + E \quad [1]$$

However, it is known that systematic variance is related to the specific form of assessment. In recognition of this fact, attempts have been made to account for these influences. In relation to CTT, the *normative accuracy model* (Lance et al., 2009) includes a systematic measurement bias term ( $SB$ ), as shown by:

$$X = T + SB + E \quad [2]$$

As the name implies, *bias* is assumed to be *invalid*; however, as some researchers have noted, this ‘bias’ is often a valid reflection of the target (Hoffman & Woehr, 2009; Lance et al., 2010): It reflects “valid differences in perception” (Borman, 1974, p. 107).

Indeed, the size of these judge or target effects can be substantial, accounting for as much as three-quarters of non-random variance in multitrait-multirater studies (Lance, et al., 2009). For example, Connelly and Ones (2010) compared self- and other-ratings of personality, and found that the average self-other agreement across Big-5 dimensions varied depending on the source of ratings, with self-raters agreeing much more strongly with other-raters from within their family (mean  $R^2 = .18$  *uncorrected*; *.72 corrected*) than with other-raters from work (mean  $R^2 = .04$  *uncorrected*; *.42 corrected*) demonstrating the substantial consequences of varying the source of personality ratings. Despite the relatively low self-other agreement at work, Connelly and Ones (2010) found that other-rated personality was as good or substantially better than self-rated personality for predicting work performance indicating it provides independent validity.

In order to address these systematic and valid sources of assessment, generalisability theory provides a framework for their integration. Specifically, it allows for the decomposition of measures, such as those typically used in personality research, into a set of factors. An example of a generalisability theory model, in which components of ratings are identified on the basis of who has been the object or the provider of the relevant rating, is outlined in equation 3.

$$rating_{ij} = Target_i + Judge_j + Target_i \times Judge_j + residual_{ij} \quad [3]$$

From this perspective, the systematic bias of equation 2 is composed of valid variance, not mere error. So, in the model represented in equation 3, ratings are a function of not only persistent variance between targets, but also variance between judges and the interaction between these factors. In this more general model, targets present a phenotype (i.e., they provide opportunities to be observed) that judges use or fail to use in ways that reflect judges' own individual differences (Funder, 2001).

Returning to the Big-5 model of personality, this analysis implies that factor analyses of personality ratings contain, and conflate, variance attributed to the presence of effects related to targets, judges, and interactions between targets and judges. In support of this claim, Funder, Kolar, and Blackman (1995) provide an example of these separate effects: They reported that judges can validly assess personality even when their ratings are only modestly correlated (mean  $r = .25$ ) with those of judges who have observed targets in different contexts. These judge-target relationships clearly complicate models of personality assessment; yet, at the same time, they make it more accurate and comprehensive.

In addition to these considerations, the intra-individual processes that lead to observable inter-individual differences always occur within situations and are always linked with outcomes (Van Egeren, 2009); for this reason, the Target term in equation 3 may be decomposed further, as shown in equation 4:

$$\begin{aligned}
 Target_i = & Process_m + Situation_n + Outcome_o + Process_m \times Situation_n + Process_m \times \\
 & Outcome_o + Situation_n \times Outcome_o + Process_m \times Situation_n \times Outcome_o + residual_{mno}
 \end{aligned}
 \tag{4}$$

With respect to equation 4, for example, the consequences of individual differences in sensitivity to aversive stimuli (RST) will depend on the situation (e.g.,

presence or absence of events or stimuli) and outcomes (consequences that will accrue to the individual), plus their various interactions.

Just as the Target effects in equation 3 can be decomposed, so too can the Judge effects, and in comparable manner because a judge's rating is, in itself, a behaviour, determined in part by the judge's own processes. It has long been accepted that judges' ratings are affected by the outcome they are pursuing when producing a rating (Vazire, 2010), but they are also affected by the specific target behaviours observed and the situation in which these are observed (Kammrath, Mendoza-Denton, & Mischel, 2005; Reynolds & Karraker, 2009; Saucier, Bel-Bahar, & Fernandez, 2007).

Indeed, such is the relevance of situations for judges, when they are not provided with sufficient information about them, then either they infer or actively create situations to enable them to construct ratings (Wiemers & Poropat, 2013). So for judges, their 'situation' can be decomposed by considering the targets' observed behaviours and observed situations. These points lead to equation 5, which has been simplified for presentation but which can be readily expanded:

$$\text{Judge}_j = \text{Process}_p + \text{Observed Behaviour}_q + \text{Observed Situation}_r + \text{Outcome}_s + 2\text{-way interactions} + 3\text{-way interactions} + 4\text{-way interaction} + \text{residual}_{mno} \quad [5]$$

The final step in this analysis would be the integration of equations 3, 4 and 5, which for the sake of simplicity is not attempted here.

Temporal effects, such as those analysed by Fleeson and Gallagher (2009), are not explicitly incorporated within this analysis but they are implicit within the various effects associated with situations and outcomes, which vary substantially with time. In

a similar manner, cultural and linguistic effects are subsumed within components such as situations, outcomes, and interactions between processes and these factors. It should also be noted that this analysis implicitly accounts for the finding that factor analyses of intra-individual (Wundtian) variation produce different factors to more traditional factor analyses of inter-individual (Galtonian) variation (Molenaar & Campbell, 2009), because they combine different variance components.

### Implications for Real World Personality Assessment

The above discussion highlights a number of implications for personality assessment, some of which at first may appear rather daunting. But we believe that closer attention to them may point to important ways forward to improve the reliability and validity of all forms of assessment. Yet, implementing these solutions is not going to be easy. To begin with, there remains a strong emphasis on correlations between ratings and exploratory factor analyses in personality research. However, these systematically omit (or otherwise obscure) large portions of the variance and associated causal factors, as discussed above. Worse still, partialling of variance into target and judge components does not adequately address this issue because knowing the amount of variance associated with targets and judges does not explain what produces it. In order to cast new light on this specific issue, it would be necessary to deconstruct these variance components further.

Given these considerations, the personality models that exist, as epitomised by the Big-5, cut across these complicating factors to yield very broad factors of general relevance. This is an important achievement and goes a long way to confirming the general nature of personality at *this* specific level of description. However, it side-

steps the more fine-grained analysis of personality which is crucial in many applied contexts.

The inescapable problem that faces the personality psychologist is the sheer complexity of the object of study – it is for this understandable reason that most psychologists do not include individual differences measures in their research work. Therefore, it is for reasons all too easy to comprehend, typical forms of personality assessment have not risen to these challenges. How would it be possible to rise adequately to meet them?

### The Way Forward?

The requirement to achieve the potential of a fully-fledged Cronbachian paradigm in personality assessment would entail much larger and more comprehensive databases than are currently available. At a minimum, such a database would include sets of factors corresponding to targets crossed with judges crossed with situations crossed with intra-individual (neurobiological) processes. As noted by Poropat and Corr (2014), although it remains useful to nibble at the edges of a problem, it is time to start thinking bigger. It needs to be recognised that the magnitude of this enterprise would be comparable to the shift in physics from table-top experiments of Newton and Faraday to multi-national collaborations involving very large research teams. The vogue for ‘big data’ in the internet age now has a parallel in the field of personality psychology and, perhaps, the technology afforded by the internet will enable the realisation of this vastly expanded personality research programme. It is far from being impractical, but it does require an industrial revolution for psychology, transmorphing from cottage industry to factory scale production.



However, lest it be implied that we must wait for this distant research utopia to materialise, our analysis suggests that we can move steadily towards this goal by more modest and incremental means, namely by increasingly including components of the generalizability theory in ongoing research – there is evidence that this has already started to happen (e.g., Kandler, Riemann, Spinath, & Angleitner, 2010; Riemann and Kandler, 2010). As a specific suggestion, immediate research efforts could be directed at examining how both targets and judges are affected by intra-individual processes and situational factors, and their interactions.

This research programme may begin to show just how different forms of personality assessment models are maximally useful in specific contexts and for specific outcomes. For example, ratings by family, friends, and colleagues, across different situations and outcomes, should be expected to yield valuable information concerning the true nature of personality, including the common variance to the target and the unique contributions from raters, situations and outcomes.

This general form of research holds considerable potential for differentiating underlying intra-individual (biological) processes from more social processes, and importantly how these factors relate to each other. Unfortunately, this approach is rarely seen in biologically-oriented model of personality (e.g., RST), yet it is highly applicable.

What is needed is a new discipline of ‘personality analyst’ comparable to ‘analysts’ in econometrics. The unifying skills of this new discipline could then be called upon to assist in the more sophisticated analysis of specific personality research questions (e.g., how sensitivity to gain and loss relate to various forms of occupational performance which comprise subjective performance and subjective reputation).

There may also be more specific merits of placing emphasise on different processes. For example, a Wundtian-based approach may be best at predicting and explaining intra-individual factors, such as psychosocial development and cognitive processes — the implication is that temperament personality theories (e.g., RST), when validly assessed, may provide a more effective account of within-individual cognitive development and decision-making. In contrast, but not in contradistinction, a Galtonian-based approach may be maximally useful for predicting socially-valued outcomes, such as career success, and work and academic performance as it is at this level where population-level differences between people are most marked. Of course, integrating intra and inter-individual differences would remain important, but only where this is required. The Cronbachian perspective discussed above shows just how this aim may be achieved.

#### Concluding Thoughts

The goal of any scientific endeavour is to produce a fully integrated *causal* model of nature: Causes cannot be inferred from effects, therefore a principled theoretical approach, armed with methodological tools, is needed. Couched in terms of a Cronbachian perspective and generalisability theory, in relation to personality assessment, and the underlying causal processes it operationalises, a comprehensive approach requires consideration of a more complete full range of variance factors, which combines target, judge, situation, and outcome.

The counsel of caution issued by our approach is that the nature of personality factors and processes warrants more than the simple assumption that personality (operational) assessment reflects, in some simple and straightforward matter, underlying (latent) theoretical constructs, and all else that is measured is nuisance

‘method variance’: The true dynamic action of personality processes may well be in the interaction of these factors and not in their separate main effects.

Although adopting a Cronbachian paradigm poses many challenges, the scientific payoff would be considerable if it afforded the opportunity to unravel the multifaceted true nature of personality. This approach should even help to tease out the causal processes as examined in such areas such as functional neuroimaging, which no less requires the matching of judge, situation and outcome effects to explain the personality of the target subject. The full potential of the synthesis of the theoretical, statistical and technological can now be glimpsed on the personality psychology horizon.

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