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Person–situation integration in research on personality problems

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ABSTRACT

In this paper, we demonstrate how the common two-factorial ANOVA model can be used to address issues of personality and personality pathology. Therein, the persons are treated as one factor and the situations are treated as another factor. Common research questions regarding personality problems may be phrased in terms of so-called person- and situation-typicalities. We present an agenda for future research on personality problems, arguing that relevant domains of functioning, performance expectations, and outcomes should be distinguished from each other more clearly. We also discuss the strengths and weaknesses of various assessment methods, and argue that behavioral observations in standardized interaction situations provide the most promising approach for assessing personality problems in the domain of interpersonal behaviors.

1. Introduction

Since the early 90s (e.g. Widiger & Trull, 1992), researchers have been trying to establish a closer connection between the fields of personality and personality disorders. Until then, the two fields had been co-existing largely independent of each other, each with its own conferences, journals, and scientific language. Although some progress has been made on the way towards a better integration, much of this segregation persists until today.

The majority of integration efforts so far aimed at identifying a basic set of personality dimensions that may also be useful in understanding clinical personality phenomena. Most prominent among these is the Five Factor Model (Digman, 1990; Goldberg, 1993; John, 1990; John, Angleitner, & Ostendorf, 1988; McCrae & Costa, 1990). However, the integration of personality research and personality disorder research is still at an early stage. There are many more topics from basic personality research that are of direct relevance for studying personality disorders. The present paper is to highlight some of these, focusing mostly on the person–situation-debate.

The term "personality disorder", just like the term "personality", basically refers to consistencies in how *persons* think, feel, and behave *across situations*. Accordingly, researchers are often interested in questions like the following: What is the impact of the situations on the behavior that the persons exhibit? What is the impact of stable inter-individual differences on that behavior? How variable or how rigid is the behavior of the persons across the situations? How variable is the behavior of persons who are in the same situation? And finally, if one considers the behavior of a given person in a given situation: How typical is that behavior (a) as compared to the behavior of other persons who are in the same situation, and (b) as compared to the behavior of that person in other situations?

In the following, we will demonstrate that the above and many more related questions can be addressed within the framework of the standard (full factorial) two-way analysis of variance (ANOVA) design. Therein, a number of persons are exposed to a number of situations, and a sample of one (or more) behavioral measure(s) of the same type is collected in each cell. The persons and the situations thus constitute the independent variables, while the behavioral measure(s) constitute the dependent variable(s). We will first present a simple hypothetical data set for illustration purposes, and give a brief recapitulation of the statistical ANOVA model and its parameters. Then, we will demonstrate how the above listed questions can be phrased in ANOVA terminology.

2. Analyzing the person–situation interplay within the ANOVA framework

2.1. The typical data structure

Table 1 displays hypothetical data from three persons (Andy, Burt, and Conny) in three situations. For now, let us assume that all values in the table are theoretical means.[1] The scores in the cells express the level of some behavioral quality, say, *cheerfulness*. A

[1] Loosely speaking, this means that the values reflect the ideal scores of each person in each situation on average in the long run, i.e. across a – fictional – infinite number of repetitions of the same setting and free of empirical measurement problems.

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Table 1
Hypothetical data set (theoretical level).

Person	Situation			Mean $\mu_{j\bullet}$	Main effect α_j
	Funeral	Bar	Joke		
Andy	3	3	3	3	−2
Burt	3	5	7	5	0
Conny	3	7	11	7	2
Mean $\mu_{\bullet k}$	3	5	7	5	–
Main effect β_k	−2	0	2	–	–

score of 1 would reflect a very low level of cheerfulness, a score of 11 would reflect a very high level of cheerfulness.

Let us assume that the first situation is a funeral. In our example, Andy, Burt and Conny all behave alike in this situation: they silently stand by the grave, with sad expressions on their faces (cheerfulness: 3). After the funeral, the three of them go to a bar together (second situation). In this situation, Andy continues to be very serious (3), Burt becomes a little more cheerful (5), and Conny becomes considerably more cheerful (7). Finally, another guest joins them and starts telling a joke (third situation). Burt and Conny do enjoy the joke: Burt starts smiling (7), whereas Conny bursts with laughter (11). Andy, however, continues to wear the same grave expression he wore at the funeral (3).

2.2. The two-way ANOVA model

In general, the two-way ANOVA model consists of two experimental factors (independent variables), factor A with J levels and factor B with K levels, and a random variable Y (dependent variable) which is assumed to be normally distributed with mean μ_{jk} in cell (j,k) and equal variance σ^2 in each cell. For analyzing the effects of persons and situations, and their interplay, let us assume that factor A denotes the rows (persons), whereas factor B denotes the columns (situations). For the sake of simplicity, let A and B be fixed factors. The μ_{jk} values may differ between cells, and the various types of such differences are termed 'effects' (cf. any standard textbook on statistics for experimental psychology, e.g. Maxwell & Delaney, 2004). The design shown in Table 1 is an example of the μ_{jk} values. From the cell means, marginal means and a grand mean are computed as follows:

$$\mu_{j\bullet} = \frac{1}{K}\sum_{k=1}^{K}\mu_{jk} \text{ (mean of row } j\text{);}$$

$$\mu_{\bullet k} = \frac{1}{J}\sum_{j=1}^{J}\mu_{jk} \text{ (mean of column } k\text{);}$$

$$\mu = \frac{1}{J\cdot K}\sum_{j=1}^{J}\sum_{k=1}^{K}\mu_{jk} \text{ (grand mean)}$$

Now, main effects for rows and columns are defined as follows:

$$\alpha_j = \mu_{j\bullet} - \mu \text{ (main effect of row } j\text{)}$$
$$\beta_k = \mu_{\bullet k} - \mu \text{ (main effect of column } k\text{)}$$

Referring to our hypothetical data set displayed in Table 1, we may say that the main effect of row j reflects the *person main effect* of person j (how the average behavior of person j across situations differs from the average behavior across all persons and situations), whereas the main effect of column k reflects the *situation main effect* of situation k (how the average behavior in situation k across persons differs from the average behavior across all persons and situations). In addition, interaction effects are defined as follows:

$$\begin{aligned}(\alpha\beta)_{jk} &= \mu_{jk} - (\mu + \alpha_j + \beta_k)\\ &= \mu_{jk} - \mu_{j\bullet} - \mu_{\bullet k} + \mu \text{ (interaction effect of cell } (j,k)\text{)}\end{aligned}$$

The interaction effects denote how much the mean in cell (j,k) differs from the value it would take if the factors A and B were additive (i.e. if the effects of factor B were the same at all levels of A, and, equivalently, if the effects of factor A were the same at all levels of B). If interaction effects differ from zero, this means that the effect of factor A is not consistent across the levels of B (and vice versa). Referring to person–situation data, it would mean that the influence of the situations on behavior is not consistent across persons, and, simultaneously, that the influence of the persons is not consistent across situations. The margins of Table 1 show the main effects for our hypothetical data set, whereas Table 2 shows the interactions.

In order to interpret interactions with regard to content, one might want to analyze the so-called *simple effects*. Here, the effects of one factor are analyzed separately at each level of the other factor. In particular, simple effects denote how much the mean in cell (j,k) differs from the average mean of row j or column k:

$$\alpha_{j|k} = \mu_{jk} - \mu_{\bullet k} \text{ (effect of the } j\text{th level of A, given the } k\text{th level of B)}$$
$$\beta_{k|j} = \mu_{jk} - \mu_{j\bullet} \text{ (effect of the } k\text{th level of B, given the } j\text{th level of A)}$$

Tables 3a and 3b show the simple effects of factor A at all levels of B (Table 3a) and the simple effects of factor B at all levels of A (Table 3b) in our hypothetical data set.

2.3. Applications

A very appealing feature of using the ANOVA model to analyze the interplay of persons and situations in shaping human behavior is that it becomes possible to address a large range of research questions, on various levels of abstraction, within the same conceptual framework.

2.3.1. Main effects of persons and situations

One set of questions that a researcher might be interested in is in how far a person's average behavior across situations, or people's average behavior in a given situation, differs from the overall

Table 2
Interactions $(\alpha\beta)_{jk}$ in hypothetical data set (cf. Table 1).

Person	Situation		
	Funeral	Bar	Joke
Andy	2	0	−2
Burt	0	0	0
Conny	−2	0	2

Table 3a
Simple effects $\alpha_{j|k}$ of the three persons given each situation and effect variances $\sigma^2_{\alpha|k}$ in hypothetical data set (cf. Table 1).

Person	Situation		
	Funeral	Bar	Joke
Andy	0	−2	−4
Burt	0	0	0
Conny	0	2	4
Effect variance	0	2.67	10.67

Table 3b
Simple effects $\beta_{k|j}$ of the three situations given each person and effect variances $\sigma^2_{\beta|j}$ in hypothetical data set (cf. Table 1).

Person	Situation			Effect variance
	Funeral	Bar	Joke	
Andy	0	0	0	0
Burt	−2	0	2	2.67
Conny	−4	0	4	10.67