Five factors or three? That is the question.

Research questions: The main question addressed by these papers (Costa & McCrae, 1992a, 1992b; Eysenck, 1992a, 1992b) is whether the five personality factors in models such as the Five-Factor Model or Big Five have a series of 'basic' attributes that would be expected of personality dimensions: a) longitudinal and cross-observer consistency; b) they are found in other personality models; c) the dimensions are found in samples that vary in terms of culture, age, sex, etc.; and d) there is evidence of heritability. The second, and more contentious, question revolves around whether five, three, or some other number of dimensions adequately capture human personality? Costa and McCrae hold that there are five whereas Eysenck holds that there are three.

Strengths and weaknesses of introduction: These papers were not structured like typical research articles. However, Costa and McCrae's (1992a) introduction does a mostly nice job of laying out the arguments advanced by both sides, and also of clarifying differences between the Five-Factor Model and Big Five. It also highlights the abundant similarities between these models. It also indicates how it will test the four basic qualities traits must have. One fair criticism leveled by Eysenck (1992a) was that they did not cite some meta-analyses that indicated that only three common factors emerged across studies, though in their response, it is clear that Eysenck missed several important contributions and meta-analyses, too (Costa & McCrae, 1992b).

What was not made clear to me (in any of these papers) is how testing for possession of these basic qualities rules out the possibility of a certain number of traits, especially because, as noted by Eysenck (1992a), these qualities are possessed by other trait systems. Of course, the same limitation is true, though this is not acknowledged, of Eysenck's personality model.

Methods: Costa and McCrae's (1992a) paper began by submitting factor analyzing a new set of NEO-PI-R facet data. They also assessed the re-test reliabilities and cross-observer reliabilities of their data. They also reported on the heritability of the factors and re-analyzed a dataset by Zuckerman et al. The design in terms of sample size is adequate, but, as noted earlier, there is not really a strong test of the hypotheses regarding the number of factors. This problem was even more the case at the time as the only feasible way to determine the number of factors was via an inspection of scree plots, which is an inherently subjective enterprise. For example, Eysenck disagreed with the conclusions from Zuckerman et al. who stated they found five factors, noting that only two were clearly present. It is likely that the subjective nature of scree plot interpretation led to many of these disagreements.

Main results: Costa and McCrae (1992a) showed a fairly close replication of the structure they obtained in an earlier sample (Table 1 of their paper), though it was not rotated to a target. Moreover, the cross-observer (Table 2 of their paper) and re-test reliabilities were quite good (rs were from .63 for Agreeableness to .84 for Openness; p. 655 of their paper). All of this was good news for personality in general, as it rebutted some of the criticisms leveled by Walther Mischel. In addition to this, they cite the literature on heritability (p. 658 of their paper) and also show that they something like the Five-Factor Model was present in Zuckerman et al.'s data (Table 4 of their paper).

Eysenck (1992a) questioned the independence of the five factors given prior findings, and in particular questioned the splitting of Psychoticism into Agreeableness and Conscientiousness, despite both being highly correlated, after correcting for attenuation, with Psychoticism (p.

668 of his paper). He also, as noted above, disagreed with the number of factors to extract from the Zuckerman et al. paper based on his interpretation of the screen plot. In reply to these criticisms and others, Costa and McCrae (1992b) subjected factors derived from three Five-Factor Model scales --- the NEO-PI-R, Transparent Trait Ratings Form, and the Big Five version of the Interpersonal Adjective Scale --- to two secondary factor analyses. In the first, they extracted two higher factors and in the second they extracted three higher order factors. The results at best were mixed (Table 1 of their reply paper), though there is some consistency there.

Other points: In addition to these points, one of Eysenck's (1992a) criticisms was that there was no theory guiding the development of the Five-Factor Model; it was derived empirically. This is, in fact, true, as acknowledge in Costa and McCrae's (1992b) response. However, Costa and McCrae asserted that the field of neuroscience was at too early a stage for work on structure to be guided by theory, a point with which Eysenck (1992b) disagreed and suggested that this view was unscientific.

Contribution: These papers markedly contributed to personality research by putting forward a lot of evidence for the existence of personality traits. What it also showed was that the dimensions of the Five-Factor Model were as good or better in terms of the basic qualities as those of other personality models. This, I think, explains to a large extent why this model was adopted by so many researchers. However, if I had been reading this paper in 1992, well before the advent of new studies and statistical methods, I would have felt that the issue of the number of factors remained unresolved. There just is no single gold standard approach to deciding how many factors to retain. This was, I think, unavoidable given the methodological and computing limitations of the time, though it is a remaining problem.

Eysenck does make a good point about the importance of theory. However, most sciences, and especially the natural sciences, begin with description of phenomenon, and that is where the disagreements between these researchers lie and where a lot of effort has been and continues to be expended. Thus, in this respect, the papers and the subsequent research have been invaluable.

Questions to consider: Are we (were they) at a point where we can move beyond description or any closer to such a point? How would things have turned out if, say, they had parallel analysis on hand to determine the number of factors? What evidence would let us rule out factor solutions with a particular number of factors (it may be useful to think of how this was determined for cognitive abilities)? Do the methodological limitations play a role in other areas of personality research? To what extent did rhetoric or data 'rule the day' on this question?

References

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