



City Research Online

City, University of London Institutional Repository

Citation: Corr, P. J. ORCID: 0000-0002-7618-0058 (2020). A consensual paradigm for personality: Introduction to special issue. *Personality and Individual Differences*, 152, 109611.. doi: 10.1016/j.paid.2019.109611

This is the accepted version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/23263/>

Link to published version: <http://dx.doi.org/10.1016/j.paid.2019.109611>

Copyright: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

Reuse: Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

City Research Online:

<http://openaccess.city.ac.uk/>

publications@city.ac.uk

A Consensual Paradigm *for* Personality:
Introduction to Special Issue

Philip J. Corr
City, University of London

Abstract

This Special Issue poses a pertinent question: Is a consensual paradigm needed, possible, or even desirable, in personality psychology? One seems necessary to unify the disparate perspectives that characterise the field, as well as to make a major contribution to the broader unification of psychology in which individual differences loom large. This discussion is presented in relation to standard models in mature science where scientific progress seems more assured. Additionally, such a consensual paradigm would contribute positively to a (at least, partial) resolution of the reproduction and replication problems in psychology and the social sciences more widely - by taking seriously the influences of personality factors and processes that can play havoc with the interpretation of main effects and how to account for error terms. In this Special Issue, 14 papers span a wide range of perspectives: Descriptive/taxonomic models, meta-theories, cognitive and motivation processes, measurement and statistics, environmental factors, and more abstract notions of human nature and the mind. Although there may be scant evidence of a consensus regarding the preferred approach, it seems clear enough that synthesis is now needed. Progress along this path should make a major contribution to the construction of a viable consensual paradigm *for* personality.

Mature science is defined by standard models - they codify knowledge and define research priorities. In contrast, immature science has a proliferation of approaches, disparate research priorities, and a fragmented empirical base – consensual knowledge does not exist – and, in consequence, there are interminable debates not readily amenable to resolution. This state of affairs impedes the rational and efficient allocation of scarce research resources, incurring a significant (if largely unnoticed) opportunity cost in terms of impaired scientific progress. In this vacuum, politically-inspired public policy influences on resource allocation decisions – where dogma often trumps data – can seriously waylay true scientific progress.

As noted by Kuhn (1970), the major difference between the mature ('hard') sciences and the social sciences is the absence of a paradigm in the latter - according to Barnes (1982), a paradigm is "an accepted problem-solution in science, a particular concrete scientific achievement". Mature science is epitomised by physics. While debates rage over theoretical models and interpretation of data, physicists know which major scientific problems need attention; and, while the solution may not be readily to hand, the nature of the problem is well delineated. The achievements of mature science garner the respect of the general public, even if they do not fully understand them – if nothing else, they have cause to celebrate their practical utility (e.g., GPS systems have to be adjusted daily to account for Einsteinian relativity effects.)

Matters are different in psychology and the wider social sciences. Our own field, personality psychology, is replete with a multitude of perspectives and approaches; very often they seem loosely, if at all, connected to one another. It would seem sensible to strive towards a consensual paradigm (as far as one is possible), with associated models, based on the most rigorous experimental data and statistical analysis – this is surely the path of future scientific progress? (We need not fall into the trap of believing the goal of psychology is to emulate the hard sciences – these are different epistemological worlds and, thus, necessitate different scientific treatments.)

In the light of the above considerations, it is now legitimate to ask: Is a consensual paradigm needed, possible, or even desirable, in personality psychology? The answer to this question is important, especially given the fact that personality factors and processes impact all areas of psychology, and beyond. Crucially, to help general psychology work towards its own consensual paradigm and models, we must first construct one in personality psychology. This successful outcome would serve another function, namely to encourage general psychology to take personality psychology far more seriously than it does at present. (The dismal reality is that general psychology still views personality psychology as characterised

by confusion and incoherence, offering little in the way of theoretical or practical value – those of us working in the field know this to be incorrect.) Over the past few decades, much has been achieved to challenge this (mis)perception (Corr & Mobbs, 2017); but, too it must be admitted, much more still needs to be done.

The above issues provide the impetus for this Special Issue. When thinking about a consensual paradigm *for* personality, we have major challenges to face. First, any such paradigm would need to take into account multiple levels of description, taxonomy and causal factors/processes. Secondly, it would need the power to accommodate specific theories of differing *genera*. Despite the difficulty inherent in this endeavour – and opinion is divided on its merits – the value of its success would be considerable. At the very least, the effort would help to define the scope of the problem and point to the ways future thinking and research might edge ever closer to its attainment. There is also researcher preference to consider: Many of us prefer our own local theories to more global ones that, by their nature, require the coordination over many people and places.

One of the ‘late-greats’ in the field, Hans Eysenck, was forthright on how progress should be made. Not only did Eysenck claim we need a paradigm in personality psychology, and that psychology in general will not progress very far or fast without one, he believed his own approach was the best on offer – or, at least, the foundations of one. In his Presidential Address to the London inaugural meeting of ISSID in 1983, Eysenck once again called for a paradigm *for* personality, which he elaborated in a paper in the same year (Eysenck, 1983). Without such a paradigm, he saw the state of affairs as being “conducive to arbitrary choice in terms of existing prejudices on the part of the student” (Eysenck, 1983, p. 369). Despite the passing of some 35 years, it would be Panglossian to conclude that the state of affairs described by Eysenck has changed radically – although there have been packets of integration (see Corr, 2019), itself a sign of a more general potential. It may be an exaggeration to say that the field have been largely indifferent to attempts at integration; yet progress has been (arguably too) slow. In any event, there has been a notable tendency for the development of *specific* theories at the expense of more *general* ones which have, in any event, fallen out of favour.

Now, given his formidable insights and accomplishments (Corr, 2016), Eysenck had every right to claim that his own approach offered the best hope of unifying personality psychology and, by so doing, helping to unify the whole of psychology. The potential of his framework for a paradigm *for* personality can be seen in his integration of genetics, biology, psychometrics, experimentation, psychopharmacology, and applied applications in so many

areas of life (e.g., clinical, forensic, occupational, health, political attitudes and behaviour, and others). Eysenck's oft-heard pronouncements were in the service of related calls for the unification of experimental and correlational branches of psychology, famously made by Lee Cronbach in his 1957 Presidential Address to the American Psychological Association (APA) (Cronbach, 1957).

As the passage of time has revealed, Eysenck's (1965, p. 8) clarion call, even when heard was not heeded – yet it is difficult to refute his central postulate:

“Individuals do differ...and it seems to me that psychology will never advance very far without a recognition of the complexities which are produced by this fact of personality.”

That a generally agreed upon paradigm in personality psychology is needed now just as much as in Eysenck's time is suggested by the failure of general psychology to incorporate systematic individual differences into their thinking and research. General psychology cannot be held too harshly to account for this omission if personality psychology itself has not offered robust and practical models, underwritten by a general paradigm. In contrast to the majority of experimental researchers outside our field, we know that proper consideration of systematic individual differences helps explain the considerable error term found in most studies – something Wilhelm Wundt appreciated at the dawning of experimental psychology.

Again, we can look to Eysenck (Eysenck, 1983, p. 393) for sage comment:

“I believe that a solution to the problem of personality research and measurement is fundamental to the development of a truly scientific psychology, whether in the experimental, social, industrial, educational, or clinical field.”

There is something else of interest about taking seriously the influences of systematic individual differences in wider psychological science: It may well explain (at least part of) the reproduction and replication problems in psychology and wider afield – subtle treatment/condition x personality interactions may confuse, even conceal, experimental main effects, which often “fail to replicate”.

Reproduction and Replication Problems in Psychology

It is entirely feasible that personality psychology has the potential to make a major contribution to understanding and helping to resolve the problems of the reproducibility,

replication, reliability, robustness and generalisability of, even, major psychological findings (Lindsay, 2015; Open Science Collaboration, 2012) – such is the extent of this problem, some argue that it is eroding confidence in all psychological research (Earp & Trafimow, 2015). However, the potential of personality psychology to serve this positive role can only be realised once we have at our disposal a consensual paradigm and related congruent models and methods. Instead of viewing reproduction and replicability as problems, more fruitfully they can be seen as opportunities for personality psychology to demonstrate its true scientific value. Arguably, there are fewer more important pressing matters in psychological science.

However, the potential role of personality psychology needs to be placed in proper perspective: It is not the whole story. There are bound to be many reasons for failures to reproduce and replicate, from outright fraud, *P*-hacking, HARKing, and selective reporting (sometimes at the insistence of journal editors who want a straightforward research story to be told to their readers); and, as well, to use the felicitous phrase of J. K. Galbraith, ‘innocent fraud’ (data cleaning, removing outliers, etc.) – there is also the ever-present problem of incompetently conducted research (a constant factor in any research field – although, perhaps more so in psychology where research designs are often intricate and intrinsically complex).

Whatever the respective merits of the above factors in the reproduction and replication of research studies and findings, the *very* idea that systematic individual differences between research participants, in terms of personality, intelligence, emotion, motivation, mood, states, and so on – and interactions with situational/contextual factors - are playing little or no role in experimental and real-world outcomes is little short of outlandish. (Often, and with some justification, researchers prefer to focus on the other factors contributing to these problems; however, they seem often unable to grasp the rather simple statistical fact that personality x treatment/condition interactions may be highly relevant *even* in the presence of null main effects – indeed, such cross-over interactions may account for, by cancelling out main effects, the existence of null findings!) At a bare minimum, the precautionary principle should counsel us to include systematic individual differences in all studies where it is suspected they may be relevant – this should be routine practice.

To highlight this point, as noted by Corr (2016), in a letter to the July issue of *The Psychologist*,

“It is as if a research chemist were content to use pieces of laboratory equipment with scant regard to their varied and unknown electrochemical properties. As they would have failed to replicate the exact methodology, how likely is it that other experimental

chemists would replicate their findings? In psychology, individual characteristics affect behaviour in most situations – even purely experimental ones, where effect sizes tend to be small compared with the unexplained ‘error’ term, much of it concealing systematic individual differences which may be influencing experimental factors in varied and unknown ways. It is futile lamenting replication failures if we do not recognise the importance of the individual characteristics of participants in psychological studies.”

Papers in this Special Issue

The topic of this Special Issue was the subject of the Presidential Address to the 2017 ISSID meeting in Warsaw (Corr, 2017), where a call was made for expressions of interest, followed by a formal announcement in *Personality and Individual Differences*. This elicited wide interest and resulted in the current collection of papers.

It should be noted that the scope of this Special Issue differs from the 2017 target article in the *European Journal of Personality* (Baumert, Schmitt, Perugini, Johnson, Blum et al, 2017). Written by a team of leading personality psychologists, this impressive target article addressed how three foci of personality psychology should be integrated, despite the fact that “these research areas have progressed in relatively independent ways” (p. 503): (1) Structures of inter-individual differences; (2) intra-individual personality processes that drive behaviour; and (3) development of personality. Many important issues are discussed in this article, but no attempt was made to propose a general, consensual paradigm – the authors disagreed over some fundamental issues. (In the current Special Issue, Baumert, Schmitt and Perugini usefully summarise the conclusions of this earlier target article.)

The 14 papers comprising this Special Issue make it abundantly clear that, for now, it is not possible to outline a consensual paradigm for personality psychology; yet, at the same time, it is clear enough that they contain many (if not most) of the elements of one.

Brief Descriptions of Papers

Anna Baumert, Manfred Schmitt and Marco Perugini summarise the main points of the 2017 target article, described above. They start by noting that structural approaches to personality have achieved considerable progress in the *description* and *prediction* of individual differences in thoughts, feelings and behaviour – but *explanation* has fared less well. In order to rectify this situation, they lay stress on the integration of structural, process-oriented and developmental approaches. Baumert et al. also highlight the resulting challenges

for future personality research. The issues they address are fundamental to any consensual paradigm for personality.

Robert Hogan and Ryne Sherman are interested in the general properties of human nature. They sketch a model of personality containing six points: (1) Personality theory is crucial for understanding life; (2) life is largely about competition; (3) there is competition *within* groups for individual status, and there is competition *between* groups for collective survival; (4) academic psychology focuses on within group competition, but between group competition can be more consequential; (5) successful within group competition depends on social skill and successful between group competition depends on leadership; and (6) personality determines/explains the outcome of both forms of competition. Hogan and Ryne note, "People are the deadliest invasive species" and given their 'frightful potential' we should know much more about them, reminding us the "go-to" discipline is personality psychology which is concerned with the broad problem of human nature. Their paper addresses the wide-ranging implications of psychology set in an evolutionary context of within and between group cooperation and conflict, with personality at its core.

Shulamith Kreitler endorses the need for a consensual model, noting that psychology is "blessed" with models yet a consensual one is a "rare species". Top level issues are discussed in relation to two major assumptions: Personality (1) is a system; and (2) it consists of interrelated levels. Following are descriptions of the four major levels of personality: *Biological* (genetic and physiological); *behavioural*; *emotional*; and *cognitive*, emphasizing characteristic components and processes. Kreitler discusses the major functions that result from interactions between these major levels, including creativity and traits. Self is also discussed, considered as an experientially-based construct distinct from personality. Finally, theoretical and methodological implications are presented, serving to lay the groundwork for personality psychology in the major branches of psychological science.

Kenn Konstabel provides a bird's eye perspective, not in the form of a new theory of personality, nor even a comprehensive review of the most important facts, but rather a conceptual framework, or metatheory, that should clarify thinking about the nature of personality. It is noted that personality descriptions - from self-reports or behavioural observations - are causally heterogenous, reflecting self-presentational concerns, and such like, in addition to functional elements of personality (called here the "personality system"). In turn, functional elements can be subdivided into temperament, habits and knowledge, and self-regulation - these components form a nested hierarchy, with each "upper" level controlling those below. In addition, the use of cultural 'tools' (symbolic representations of

concepts and ideas) allow for more complex forms of control. The point is made that longitudinal design - either developmental or micro-longitudinal – is most useful in pinpointing their contribution.

Returning to an evolutionary theme and taking a “super” meta-theory of personality, Christopher Jackson, Amirali Minbashian and Christian Criado-Perez view personality traits as comprising neuronal substrates and mental representations. Using their multi-level meta-theory, they examine the link between these factors and reproductive success – bringing evolutionary considerations once again to the fore. They claim that their multi-level meta-theory of personality offers an over-arching umbrella for existing meta-theories, and explicates the different levels needed to understand personality architecture.

The complexity of different levels of traits is taken up by Gerald Matthews who starts by noting that theories of personality traits refer to qualitatively different explanatory mechanisms, which limits the potential for a consensual paradigm. A trilevel cognitive science analysis is presented that distinguishes multiple, qualitatively different explanations for expressions of personality. Expanding this analysis, the Cognitive-Adaptive Theory of Traits (CATT) is presented as a conceptual framework – it serves to highlight the value of explanatory pluralism that expects and accepts disunity in personality theory. The conclusion is that it is preferable to work with multiple, conceptually rigorous theories at different levels than to aim for a single overarching paradigm – at least, at the present state of theory development.

With an emphasis on the potential of the cognitive approach in personality psychology, Michael Robinson, Robert Klein and Michelle Persich note that, although Hans Eysenck’s personality paradigm was too narrow, his goal of integrating personality trait studies with experimental psychology remains laudable. Traits are fundamental to the structure of personality, however a more complete science will need to integrate them with mechanisms of operation while accounting for both *between*-person and *within*-person differences. Robinson et al. contend that cognitive tasks are well suited to help with integration, especially as they are designed to model social-emotional and behavioural processes. Concrete ways are given in which cognitive or behavioural tasks may be used to understand: (a) personality trait functioning; and (b) person by situation interactions. Marrying the description of traits and the explanation of cognitive tasks, Robinson et al. conclude: “What we have described should not be THE paradigm for personality psychology, but it can be a major paradigm.”

The dynamics of motivation also needs to be considered, as highlighted by Virgil Zeigler-Hill, Jennifer Vrabel, Destaney Sauls and Mark Lehtman, who relate it to two broad approaches to understanding personality, each proceeding in isolation from the other, focussing either on: (1) the structure of personality; or (2) personality processes. They note that calls for integrating these two approaches have met with limited success and that one way to achieve this integration is to bridge the gap between structural and process-oriented approaches. These connections are reviewed and suggestions are given for improving the integration of motivation into personality theory and research. A compelling case is made for the claim that motivation factors and processes should play a large role in personality psychology.

Continuing on the theme of dynamics, Joanna Sosnowska, Peter Kuppens, Filip De Fruyt and Joeri Hofmans offer an integrative approach to personality that combines within-person and between-person differences, relating to states and traits. They draw on the principles of dynamic systems theory, presenting the Personality Dynamics (PersDyn) model - a novel framework that captures people's typical pattern of changes in personality states using three model parameters: (1) Baseline personality (reflecting the stable set point around which states fluctuate); (2) personality variability (or the extent to which personality states fluctuate across time and situations); and (3) personality attractor force (relating to the swiftness with which deviations from baseline are pulled back to baseline). The authors contend that the PersDyn model has the potential to integrate different perspectives on individual differences and they set about demonstrating that their approach offers the potential to serve as a consensual paradigm of personality. Attesting to its practical implications, the authors relate it to clinical psychology, social psychology, and work and organizational psychology,

Innovations in measurement technology can influence theory, as Christian Montage and John Elhai discuss in relation to the emergence of the Internet of Things (IoT). Specifically, as individuals and societies are increasingly digitally interconnected, multiple sources of data from human-machine-interaction will be used to predict psychological traits and states – this is already happening. Focus is on a recent addition to the toolbox of the personality psychologist: Digital phenotyping via methods from Psychoinformatics. This will help resolve one practical problem, namely that personality psychology research is conducted in many different scientific areas and often researchers are unaware of each other's existence. The future opportunities for greater connectivity are vast and are only starting to be explored. Fittingly, as Montage and Elhai state, "...the future needs to find a *standard personality*

questionnaire and standard psychological constructs, which will be applied in every personality related research...”.

Crucial to any general consensual approach is the issue of structure and taxonomy. Gregory Boyle details how any research into a paradigm of personality requires a taxonomic delineation of normal and abnormal personality trait constructs, dynamic (motivation) traits, and transitory (emotional/mood) states. Boyle contends that the Cattellian Psychometric Model is such an empirically-derived taxonomy of factor-analytically elucidated psychological constructs. Cattell’s model comprises 92 primary factors which has led to claims that it needs to be simplified. To serve this purpose, Boyle reports a series of factor-analytic studies reducing the model to just 30 separate factors, enabling a reduced set of neo-Cattellian instruments. Boyle concludes that Cattell’s general approach continues to offer a general framework for understanding many of the themes and problems in personality psychology – given its historical importance and relevance for the future, it should not be overlooked.

Continuing the measurement theme, Colin Cooper tackles the issue of whether personality theory should develop *breadth*, by exploring more narrowly defined personality traits, or *depth*, by deepening our understanding of known, higher-order traits. Cooper notes that narrow personality traits are often statistical artefacts (bloated specifics); and he goes on to argue that, sometimes, they are not even based on individual differences in behaviour at all and, as such, they may not represent causal influences – or, indeed, any real characteristic of individuals. Cooper cautions us that any consensual approach must have sensible and robust psychometrics, and cautions us that personality factors must be more than mere social constructions. Measurement is fundamental to any consensual model and Cooper provides guidance on how we can avoid common pitfalls. His conclusion is that focussing on the origins of higher-order personality traits is much likely to be more useful than focussing on narrow traits with all their attendant problems.

Taking a much broader perspective on the issues facing personality psychology, Liudmila Liutsko reviews and reflects upon emerging trends within integrative personality models, and proposes a broad personality model that recognizes the importance and interdependency of personality within the context of Planetary Health, which draws attention to the fact that a person is an element of bigger constructs (e.g., society and humankind, including the social environment). Based on a review of relevant findings, Liutsko proposes the Environmentally Integrative Personality model: This model draws attention to the mechanisms underlying personality development and the bidirectional interactions between

environment and health and well-being. Liutsko reminds us that personality psychology needs to connect with the world outside psychology, to a much wider environmental ecosystem.

Also adopting a broad perspective, Konstantinos Petrides introduces Psychobionomy, which is a general system attempting to explain and utilize the laws governing the mind - conceived as the source of all life (it is an idealist system): The objects of external experience are dependent on the mind and do not require physical material for their existence. It is also an all-embracing system, intended to be far broader than any personality theory because it is concerned with “life as a whole”, and not merely slices of it. Petrides’ is a very broad system, showing how personality can be combined with other issues in general psychology; and it is ambitious: Psychobionomy is said to be an absolute psychological system that views the world as part of the individual, rather than the individual as part of the world – examples from trait emotional intelligence and belief-importance are used to help the reader understand what is being conveyed. The claim is made that this approach can help to address, recast, or transcend a range of “never-ending supply” of enduring theoretical and methodological challenges in personality psychology. Two key challenges are highlighted, namely: (1) The integration of idiographic and nomothetic approaches; and (2) the restoration of the centrality of self-perceptions and their methodologies – these are recommended as the pathway to the realization of Self-Knowledge. Highlighting and discussing the numerous unstated and unexamined assumptions in personality psychology – some of which seem unresolvable or, at least, highly intractable – is, itself, an important task. But, Petrides is far from convinced as to the desirability of a consensual model; as he says, “...the pursuit of consensus engenders groupthink and ‘lowest-common-denominatorism’ in theory building” (of course, they need not), but it is a point worth noting. (It might even be seen that Psychobionomy is offering the foundations of such a model.) The approach offered is a rich abstract-philosophical approach and quite unlike the vast majority of perspectives and models in personality psychology. It is challenging and is bound to provoke – but this is the point, as it requires us “...to discard any concepts and notions, irrespective of how prevalent, consensual, and cherished, for which...[we]...are unable to find evidence in...[our]...direct experience.”

A consensual paradigm *for* personality would benefit from the articulation of innovative and bold theoretical perspectives of the type showcased above. This is especially important when it forces us to reassess cherished assumptions and beliefs that are not in receipt of firm empirical support. As Richard Dawkins (2005; see Twist, 2005) reminds us, the universe is queerer than we imagine, and theories about its true nature are hard to believe;

so too in personality psychology – where challenges to our preconceptions should be positively encouraged.

Conclusion

The contributions to this Special Issue attest to the vitality and diversity of personality psychology. They provoke us to consider fundamental matters. Although a consensus has not emerged, common themes have, covering evolutionary, genetic and biological factors, emotion, cognitive and motivation processes, along with replicable and robust descriptive/taxonomic models. As argued in several of the papers, we may need to rethink some major assumptions and beliefs, if only to provide a more adequate defence of them.

Although the specific form such a consensual paradigm might take is bound to differ from Eysenck's preferred approach, it would invariably share many of its features, combining experimental research and real-world applications. But, it would need to venture further afield into narrative analysis and how personality factors and processes influence the wider world and, in turn, are influenced by it.

Although a consensual paradigm may still be far some way off, one would seem vital to advance the field along the lines of "normal science" (Kuhn, 1970) – the regular work of scientists within a settled paradigm without continually questioning underlying assumptions. But, is it feasible? And might there not be a danger of *premature* science, rushing towards a paradigm when one is not really possible? There will be individual differences in the general attitude to this question – between lumpers and splitters - and specific preferences as to the form it should take. This is in the nature of scientific debate. Whatever the outcome, we can be heartened by the fertility of our field and, especially, by the willingness of its workers to address a fundamental issue of uncommonly wide-scale importance. Is a consensual paradigm *for* personality psychology needed, possible, or even desirable?

References

Barnes, B. T. S. (1982). *Kuhn and the social science*. London: Macmillan.

Baumert, A., Schmitt, M., Perugini, M., Johnson, W., Blum, G., Borkeanu, P,... et al. (2017). Integrating personality structure, personality process, and personality development. *European Journal of Personality*, 31, 503-528.

Corr, P. J. (2016). *Hans Eysenck: A contradictory psychology* (Mind Shapers series). London: Palgrave.

Corr, P. J. (2016). Individual differences in replication failures. Letter to the *The Psychologist* (July). <https://thepsychologist.bps.org.uk/volume-29/july/eysenck-aloof-dismissive>

Corr, P. J. (2017, July). *Personality matters in replicable psychology: The need for a consensual paradigm*. Presidential Address to the 2017 International Society for the Study of Individual Differences (ISSID) in Warsaw, Poland.

Corr, P. J. (2019, ed.). *Personality and individual differences: Revisiting the classic studies*. London: Sage.

Corr, P. J., & Mobbs, D. (2018). From epiphenomenon to biologically important phenomena. *Personality Neuroscience*, 1, 1–4.

Cronbach, L. J. (1957). The two disciplines of scientific psychology. *American Psychologist*, 12, 671–684.

Earp, B. D., & Trafimow, D. (2015). Replication, falsification, and the crisis of confidence in social psychology. *Frontiers in Psychology*, 6.

Eysenck, H. J. (1965). *Fact and fiction in psychology*. London: Routledge and Kegan Paul.

Eysenck, H. J. (1983). Is there a paradigm in personality research? *Journal of Research in Personality*, 17, 369-397.

Kuhn, T. S. (1970). *The structure of scientific revolutions*. Chicago: University of Chicago Press.

Lindsay, D. S. (2015). Replication in psychological science. *Psychological Science*, 26, 1827-1832.

Open Science Collaboration. (2012). An open, large-scale, collaborative effort to estimate the reproducibility of psychological science. *Perspectives on Psychological Science*, 7, 657-660.

0

Twist, J. (2005). Universe 'too queer' to grasp. BBC website (12 July 2005).
<http://news.bbc.co.uk/1/hi/sci/tech/4676751.stm>