

FALSIFICATIONISM DOES NOT EQUAL FALSIFIABILITY:
CRITICAL RATIONALISM AND SOCIAL PSYCHOLOGY

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Abstract

Based on an analysis of ten popular introductions to social psychology, we will show that Karl Popper's philosophy of 'critical rationalism' so far has had little to no traceable influence on the epistemology and practice of social psychology. If Popper is quoted or mentioned in the textbooks at all, the guiding principle of 'falsificationism' is reduced to a mere potential 'falsifiability', and some central elements of critical rationalism are left out – those that are incompatible with positivism and inductivism. Echoing earlier attempts to introduce Popper to social psychology by Paul Meehl and Tom Pettigrew, we will argue that a 'falsificationist turn' could help social psychology to overcome the 'crisis of confidence' (Pahsler and Wagenmakers, 2012) that has emerged recently in view of the 'Stapel affair' and the reports of failures to replicate social psychological experiments in high-powered replication attempts.

Falsificationism Does Not Equal Falsifiability:

Critical Rationalism And Social Psychology

In this paper, we will discuss the lack of influence of Karl Popper's philosophical concept of *critical rationalism* and the principle of *falsificationism* in social psychology, i.e. the assumption that the growth of knowledge is only possible by refuting theories and improving on them or replacing them with better theories. Our claims concerning social psychology's epistemology are based on an analysis of the explanation of the 'scientific method', definitions of terms such as 'hypothesis' and 'theory', and of accounts of criticism of social psychology's epistemology in ten popular introductions to social psychology which were available at the first author's institution. These books either feature a general introduction chapter summarizing both the history of social psychology and its guiding methodological principles (Baron & Byrne, 2002; Baumeister & Bushman, 2010; Hogg & Vaughan, 2008) or two separate chapters on these issues (Aronson, Wilson, & Akert, 2010; Franzoi, 2008; Gilovich, Keltner, & Nisbett, 2006; Hewstone, Stroebe, & Jonas, 2012; Kassin, Fein, & Markus, 2008; Myers, Abell, Kolstad, & Sani, 2010; Smith & Mackie, 2007).

All these textbooks say in one way or another that social psychology applies the 'scientific method' to questions about the social world, or, in G. W. Allport's (1954) words, "... how the thoughts, feelings, behaviours of individuals are influenced by the actual, imagined, or implied presence of other human beings" (p. 5). Usually, little space is given to explaining what is meant by the term 'scientific method' (see below) and the impression is created that there is a unanimous understanding of what science is, what it is not, and how scientific knowledge is acquired. We will show that this is not the case and that social psychology employs thoroughly a positivist epistemology. In contrast to Myers et al.'s (2010) claim of a "... popular uptake of Popper's ideas ..." (p. 33), we will argue that Popper's ideas – in particular the guiding principle of 'falsificationism' – have so far had little to no traceable

influence on social psychology. Consequently, if critical rationalism is mentioned in the textbooks at all, the elements of it which are incompatible with positivism are left out.

Nevertheless, we will argue that a ‘falsificationist turn’ could help social psychology to move forward in view of the ‘crisis of confidence’ social psychology has encountered recently (Pashler & Wagenmakers, 2012).

Epistemology in Social Psychology Textbooks

Social Psychology and the Scientific Method

When it comes to explaining the scientific method, most social psychology textbooks refer to the differences between everyday knowledge and scientific knowledge: in science, unproven preliminary ideas about the world must be formulated as testable assumptions (‘hypotheses’) and put to an empirical test before being accepted. “Research begins with a hunch, or hypothesis, that the researcher wants to test” (Aronson, Wilson, & Akert, 2008, p.57). Such hypotheses can either be based on spontaneous insights and observations or be derived from existing theories. Baron and Byrne (2002, p. 27) as well as Franzoi (2008, p.28) differ from the other authors insofar as here the term ‘hypothesis’ refers only to predictions derived from theories.

At some point in the research process, researchers will be able to formulate a theory that connects and explains the observed phenomena in a logical way. In the words of Kassin, Fein, and Markus (2008): “The research process involves coming up with ideas, refining them, testing them, and interpreting the meaning of the results obtained” (p. 25). Theories are defined as being “... composed of constructs (abstract ideas or concepts) that are linked together in some logical way” (Baumeister & Bushman, 2011, p. 12) or as a “... set of abstract concepts (i.e. constructs) together with propositions about how those constructs are related to one another” (Manstead & Livingstone, 2012, p. 27). To include abstract concepts into these

theories, it is necessary to operationalize them, i.e. to map them onto observable events and frame them in a measurement model. This explanation of the scientific method makes use of what is called the ‘principle of induction’: We observe regularities in nature and derive some hypotheses and finally a theory based on well-established empirical facts. All textbooks agree on this fundamental structure of the research process.

The introduction to the scientific method is usually followed by an overview of empirical research methods such as experiments and quasi-experiments. Experiments are unanimously regarded as the best way to prove/find support for assumptions about causal relations. Other research methods are regarded as inferior in this regard. However, the majority of textbooks make clear that in the end theories cannot be proven definitely, because the researchers may have neglected some important factors. Still, researchers believe in their theories and want to see their hypotheses confirmed. “Ultimately, the theory is either accepted as accurate or rejected as inaccurate. Even if it is accepted, however, the theory remains open to further refinement as improved methods of research are developed and additional evidence relevant to the theory’s predictions is obtained” (Baron & Byrne, 2002, p. 28). In the words of Baumeister and Bushman (2011): “No single study can prove anything beyond all doubt. There is always the possibility that the data turned out a certain way as a fluke, by random chance” (p. 12).

The ‘scientific method’ described throughout the textbooks, in particular experimentation, is equated with the method used in the natural sciences: “In this respect, the main difference between social psychology and, say, physics, chemistry or biology is that the former studies human social behavior, while the others study non-organic phenomena and chemical and biological processes” (Hogg & Vaughn, 2008, p. 7). As we will discuss in the next section, some textbooks mention criticism towards using the scientific method in social psychology, but none of the textbooks discriminates between different versions of the

scientific method or differences in research practices and epistemologies within the natural sciences.

Accounts of Criticism of Social Psychology's Epistemology and Practices

Five textbooks mention a 'crisis' in the late 1960s and early 1970s (Franzoi, 2008; Hogg & Vaughn, 2008; Myers et al., 2010; Stroebe, Hewstone, & Jonas, 2013; Saul, Fein, & Markus, 2008). Hogg and Vaughan (2008), discuss criticism of social psychology's reductionism and positivism. Kenneth Ring's (1967) criticism of social psychology's lack of societal relevance and Kenneth Gergen's paper on 'social psychology as history' (1973) are quoted as examples of a growing discontent with social psychology's research practices. Reductionism is described as a tendency to explain "... social behavior mainly in terms of individual psychology ..." (p. 23), whereas positivism is adherence "... to a model of science that was distorted, inappropriate, and misleading" (ibid.). On the next page, positivism is defined as "... the non-critical acceptance of the scientific method as the only way to true knowledge". Movements such as social constructivism (quoting Gergen, 1973) and discursive social psychology (Potter & Wetherell, 1987) are depicted as "... radical alternatives ..." (p. 24) to 'mainstream' experimental social psychology. The second to last paragraph on page 25 briefly says that mainstream social psychology responded to the "... problem of positivism in a less dramatic manner, which does not involve abandoning the scientific method".

In the introductory chapter by Stroebe, Hewstone, and Jonas (2013), several recent developments such as cross-cultural social psychology and the increasing importance of meta-analyses are mentioned as reactions to Gergen's and Ring's critiques. In addition, a decreased belief in experimentation itself as a consequence of Orne's (1962) and Rosenthal's (e.g. Rosenthal & Fode, 1963) research on demand characteristics and experimenter expectancy effects is discussed. Here, too, constructivism (quoting Gergen, 1999) and discursive social psychology are mentioned as new social psychological "schools" (p. 18) that emerged from

this crisis. According to these authors, the crisis has been “overcome” (p. 18) in mainstream social psychology by focusing more on contributing to the solution of important societal problems (e.g. in health psychology), by meta-analytic practices, and by a better understanding of the relations between attitudes and behavior (Ajzen & Fishbein, 1977, is quoted as an example on p. 19).

In Myers et al.’s (2010) analysis of the crisis, discontent with “... over-reliance on experimental methods and positivist assumptions to produce reductionist explanations of human social behavior” (p. 12) as well as criticism of individualism are mentioned as points of concern. Positivism is defined on p. 10 as “... an approach to science that claims true knowledge can be achieved only by sensory perception and empirical investigation”, which is more in line with the way the term positivism is usually used in philosophy of science (see e.g. Creath, 2014). Here, too, social constructionism and discursive social psychology (among others) are mentioned as amendments of ‘mainstream’ experimental social psychology. Saul, Fein, and Markus (2008) also mention a crisis but relate it more to Kelman’s (1967) ethical criticism of deception in social psychological experiments and Rosenthal et al.’s research on experimenter expectancy effects. They briefly mention the emergence of methodical pluralism in social psychology without providing examples. Franzoi (2008) just very briefly mentions a crisis of confidence in experimental methods in the 1970s but states, “Fortunately, out of the crisis emerged a more vital and inclusive field of social psychology” (p.10).

Apparently, the ‘solution’ to this crisis was by no means related to changes in epistemological principles: on the one hand there is the scientific method – the only path to ‘true knowledge’ – and on the other there is the relativist abyss of post-modernist critical science which has given up on ‘striving for truth’ altogether (Jost & Kruglanski, 2002, p.173; this article is quoted in Hogg & Vaughn, 2008, p. 25). Strikingly, even of the few textbooks that discuss criticism of social psychology’s positivism at all, not one mentions either the

critical rationalist critique of positivism or the logical and pragmatic problems connected to the use of induction as the guiding principle of knowledge acquisition. In the next section we will show that although Popper is mentioned in two of the textbooks, only one aspect of his philosophy of science is discussed: The *potential* falsifiability of scientific theories, but not the growth of knowledge by means of falsification.

Critical Rationalism in the Social Psychology Textbooks

In only two cases (Hogg & Vaughan, 2008; Myers et al., 2010), Karl Popper's works (in the first case Popper, 1959, in the second case Popper, 1963) are even cited. In the first case, it is briefly stated that "Strictly speaking, empirical tests can falsify hypotheses (causing the investigator to reject the hypothesis, revise it, or to test it in some other way) but not prove it" (p. 8). Whereas it is 'technically' impossible to prove something once and forever, a falsification of a hypothesis is depicted as some kind of nuisance, which requires a reaction from the investigator in his or her quest to find empirical support for his or her actual assumptions.

Myers et al. (2008) discuss Popper's ideas in more detail in a "focus on" window using half a book page of space. The impossibility of inductive proof and the principle of falsification are both explained and the following conclusion is drawn:

This means that, for Popper, the objective of scientific research should be that of disproving, rather than proving, theories. A theory can be considered a plausible account of the phenomenon at stake as long as researchers fail to disprove the theory. Building on this general approach, philosophers and researchers taking a positivistic stance believe that, to be considered 'scientific', a theory must be *falsifiable*. That is, it has to be possible to set up studies that can, potentially at least, show that a theory is false ..." (p. 33; italics in original).

This paragraph is noteworthy for several reasons. The first sentence seems to imply that researchers should try to disprove theories, but the injection ‘potentially at least’ seems to say that still ‘usually’ scientists would still expect their hypothesis to be ‘true’. Whereas at first it looks as if the authors were about to discuss the differences between falsificationism and verificationism, suddenly Popper’s ideas are reduced to a mere potential falsifiability – and thereby the ‘common’ social psychological understanding of the scientific method. It should be noted as well that the authors seem to equate Popper’s ideas with positivism, although in the philosophy of science Popper is usually regarded as an anti-positivist (e.g. Bartley, 1982, p. 267).

Implicit References to Popper

There are at least two paragraphs which seem to resemble Popper’s concept of falsificationism, although neither Popper nor terms such as ‘falsificationism’ or ‘critical rationalism’ are mentioned. Baron and Byrne (2003) – without quoting or mentioning Popper – say that an attempt to prove or verify a theory is “... a serious violation of the principles of scientific skepticism, objectivity, and open mindedness ...” (p. 28), whose importance was explained earlier (p. 6). Nevertheless, they agree with literally every other author of the social psychology textbooks considered here that scientific evidence is needed to support or warrant hypotheses and theories.

In the textbook by Baumeister and Bushman (2011), we also encounter a paragraph that could be interpreted in a critical rationalist way: “In the long run, science can find the right answers to almost everything. (In the short run, scientists have to be content with slowly making progress toward the truth such as replacing a partly right and partly wrong theory with another theory that is still partly wrong but a little more right)” (p. 11). However, the idea of advancing understanding by means of criticism and refutation only seems to apply to social

psychological attempts to improve on common ‘folk wisdom’: “Opposites do not attract. Instead, birds of a feather flock together (see Chapter 11). At most, common sense provides a good starting point for social psychologists to do their work” (ibid.). The idea that social psychology can improve on folk wisdom by means of empirical testing and refutation can be found in most of the other textbooks as well (often referring to the ‘opposites attract each other’ vs. ‘birds of a feather flock together’ example); but there seems to be a difference between the replacement of faulty folk wisdom with scientific knowledge and the growth of scientific knowledge itself.

But is ‘falsification’ not in fact just a play on words: Whereas *in theory* we do know that we will never prove our theories once and forever, *in practice* we still try to find support for them? In the words of Serge Moscovici:

Popper has argued that scientific knowledge can never be verified, only falsified and that falsification is the aim of scientific research. Bold conjectures are to be followed by attempts at refutation and disconfirmation. But is this really how scientists work? Actually, scientists may pay lip service to falsification while continuing to resolve their problems according to tricks handed down by tradition (1993, p. 359).

We will argue that the idea of Popper as a ‘positivist in disguise’ is based on a common but nevertheless severe misunderstanding of critical rationalism.

Popper’s theory of science

The Problem of Induction

Popper’s initial question is: How can we explain the growth of knowledge? Or, to start with a more specific and somewhat narrower question: How can we learn from experience? That is: How do we employ experience in order to gain something that by definition transcends experience: knowledge? Experience in itself gives us information only of itself; if

we expect our knowledge to be more than just a collection of past experiences, then there has to exist some process or ingredient that allows us to infer from experience something that is not contained in that experience.

Traditionally, this power has been ascribed to the process of induction. Ever since Francis Bacon, the objectivity and power of science were supposed to lie in the scientists' cleansing themselves of prejudices and then following a steady and certain path of inference from singular observations to the highest generalisations. All idols, as Bacon called prejudices, "... must be renounced and put away with a fixed and solemn determination, and the understanding thoroughly freed and cleansed" (Bacon, 1620, I/68). "Then, and then only, may we hope well of the sciences when in a just scale of ascent, and by successive steps not interrupted or broken, we rise from particulars to lesser axioms; and then to middle axioms, one above the other; and last of all to the most general." (Bacon, 1620, I/104)

Even if Bacon tried to supplement his inductive process with the need on the part of the scientist, regarding an axiom, to "... come to a conclusion on the affirmative instances" only after taking into consideration "... a sufficient number of negatives" (Bacon, 1620, I/105), that still does not address the question of how to come to a conclusion regarding 'the affirmative instances'. This problem was famously put in a nutshell by David Hume, who asked: "Now where is that process of reasoning which, from one instance, draws a conclusion, so different from that which it infers from a hundred instances that are nowise different from that single one?" (Hume, 1748, p. 21 f.)

Almost 200 years later, Popper highlighted both the psychological and the logical problems with induction in an anecdote he told about the time when he worked with the psychologist Alfred Adler in Vienna:

Once, in 1919, I reported to him a case which to me did not seem particularly Adlerian, but which he found no difficulty in analyzing in terms of his theory of

inferiority feelings, although he had not even seen the child. Slightly shocked, I asked him how he could be so sure. ‘Because of my thousandfold experience’, he replied; whereupon I could not help saying: ‘And with this new case, I suppose, your experience has become thousand-and-one-fold’ (Popper, 1963, p. 45 f.).

Not only does no number of past observations logically entail any conclusions about future observations, it is also one of our human predilections to look for, and see, confirmations of our beliefs pretty much anywhere we look. Crucially, it is also trivially easy to formulate a ‘theory’ that is so vague that one finds ‘confirmations’ of it everywhere—horoscopes are an example of that point that comes readily to mind. But then what is it, if it isn’t the inductive process, that distinguishes pseudo-science from that which is actually capable of expanding our knowledge?

In an answer to this question, Popper then goes on to point out a striking contrast in the kind of prediction that Einstein’s theory of relativity, made with respect to the attraction a massive body like the sun exerts on a photon. Far from being a prediction that is trivially confirmed, that prediction of Einstein’s went against all the accepted physical knowledge of the time:

Now the impressive thing about this case [Eddington’s expedition] is the *risk* involved in a prediction of this kind. If observation shows that the predicted effect is definitely absent, then the theory is simply refuted. The theory is *incompatible with certain possible results of observation*—in fact with results which everybody before Einstein would have expected (Popper, 1963, p. 47; emphasis as in the original).

Confirming evidence should not count “... *except when it is the result of a genuine test of the theory*”. (Popper, 1963, p. 48; emphasis as in the original). Thus, Popper arrived at a criterion

of demarcation: “The criterion of the scientific status of a theory is its falsifiability, or refutability, or testability” (*loc. cit.*).

This is based on a very simple logical asymmetry. Whereas no finite number of singular observations logically entails a general conclusion, a single observation that contradicts a theory, once it is accepted as a fact, logically refutes that theory: “Consequently it is possible by means of purely deductive inferences (...) to argue from the truth of singular statements to the falsity of universal statements.” (Popper, 1959, p. 19) Due to the logical form of scientific theories, which are typically formulated as universal statements, there is only one way to derive logically valid statements from a conjunction of such a theory and singular statements: the *modus tollens* of the form *if p then q; not q; hence, not p*.

It is important to note that this logical process can only clarify logical relations; it cannot, by itself, establish truth. But it *can* present us with a choice between two competing sets of statements: “No argument can force us to accept the truth of any belief. But a valid deductive argument *can* force us to *choose* between the truth of its conclusion on the one hand and the falsity of its premises on the other” (Notturmo, 2000, p. 10).

Falsificationism and the Growth of Knowledge

While the inductive way of thinking supposes that theories are somehow derived from facts (which is logically impossible), the falsificationist way of thinking acknowledges that theories are not derived from anything—and that in any case questions as to their genesis are beside the point. “The question how it happens that a new idea occurs to a man (...) may be of great interest to empirical psychology; but it is irrelevant to the logical analysis of scientific knowledge.” (Popper, 1959, p. 7) What is crucial, however, is that the theory a) be a good explanation of the phenomena it is designed to explain and b) have such a form that certain conclusions can be deductively derived from it.

These conclusions are then used to actually test the theory. First, they are tested for consistency, since no information can be derived from an inconsistent system. Second, the theory is compared to other theories, "... chiefly with the aim of determining whether the theory would constitute a scientific advance should it survive our various tests" (Popper, 1959, p. 10). Lastly, the conclusions are compared to observations, where it is important to choose those which are easily testable. "From among these statements, those are selected which are not derivable from the current theory, and more especially those which the current theory contradicts" (ibid.).

In this situation, such a severe test can (logically) have two outcomes: Either the new theory's predictions turn out to be accurate (in contrast to the current best theory's predictions); then the theory can be said to be corroborated and will be tentatively retained. Or the new theory's predictions turn out not to be accurate; then the theory will be falsified by our acceptance of falsifying observations. Each step along the way is fallible; every observation, every argument, every conclusion must be open to being revised if necessary. Logic never guarantees the certain, unrevisable truth of any conclusion; it can at best clarify rational choices.

Of course, owing to this pervasive fallibility and the fact that falsifiability is a criterion that makes use of one particular logical method in the appraisal of the logical relations between statements, it is necessary to add a methodological requirement in the form of a convention not to use those facts as loopholes in order to avoid risking falsification of one's theory:

For it is always possible to find some way of evading falsification, for example by introducing *ad hoc* an auxiliary hypothesis, or by changing *ad hoc* a definition. It is even possible without logical inconsistency to adopt the position

of simply refusing to acknowledge any falsifying experience whatsoever (Popper, 1959, p. 19 f.).

If we agree, however, on a common goal of science—to find progressively better explanatory theories for empirical phenomena—then we'll have to agree to play by a certain set of rules dictated by that goal. And the first rule of science is: “The empirical method shall be characterized as a method that excludes precisely those ways of evading falsification which, as my imaginary critic rightly insists, are logically possible” (Popper, 1959, p. 20).

But even when we accept the falsificationist model, there remains the major problem of when to accept a theory as actually falsified. A naive criticism would be to argue that science would soon become impossible if we postulated that any observation that contradicted a theory should render that theory falsified. In *The Logic of Scientific Discovery*, Popper never tires of underlining that he is talking about logical relations and that only an *accepted* contradictory fact would actually falsify the theory it contradicts, and that facts will themselves have to be well tested: “Thus a few stray basic statements contradicting a theory will hardly induce us to reject it as falsified. We shall take it as falsified only if we discover a *reproducible effect* which refutes the theory” (Popper, 1959, p. 66).

And thus do we arrive at an answer to the question of how the growth of knowledge is possible, of how we can fruitfully conceptualise scientific progress. It is by giving up any pretensions to certainty, giving up misleading concepts of personal objectivity, and by acknowledging that any knowledge we do have is only the best available *now* and may be overturned any moment, whenever new facts, new arguments, and new theories turn up. Not quite accidentally, this also represents the best systematic antidote against authoritarianism known to us:

With the idol of certainty (including that of degrees of imperfect certainty or probability) there falls one of the defences of obscurantism which bar the way of

scientific advance. (...) The wrong view of science betrays itself in the craving to be right; for it is not his *possession* of knowledge, of irrefutable truth, that makes the man of science, but his persistent and recklessly critical *quest* for truth (Popper, 1959, 281; emphasis as in the original).

With regard to the social sciences, Popper explicitly criticized the “misguided and erroneous methodological approach of naturalism or scientism(...): begin with observations and measurements; this means, for instance, begin by collecting statistical data; proceed, next, by induction to generalizations and to the formation of theories. It is suggested that in this way you will approach the ideal of scientific objectivity” (1976/1969, p. 90). Popper equates this approach with the aforementioned inductivist demand for an objective and value-free observation, which he considers to be impossible. To Popper, every observation is theory driven – in the natural sciences as well as in the social sciences – and “The so-called objectivity of science lies in the objectivity of the critical method” (loc. cit.). Insofar, the naturalist (or positivist, or scientific) claim of the possibility of objective observations may even hinder scientific progress, because it constitutes exactly such an ‘idol of certainty’ that is to be avoided.

To Popper, science doesn’t begin with the collection of facts and doesn’t end as a collection of facts. It begins where we struggle to explain the phenomena of the world with our current knowledge—it begins with problems:

Science, we may tentatively say, begins with theories, with prejudices, superstitions, and myths. Or rather, it begins when a myth is challenged and breaks down – that is, when some of our expectations are disappointed. But this means that *science begins with problems*, practical problems or theoretical problems (Popper, 1996, p. 95).

And since all we really find out about the world is in the form of logical relations between certain states of the world (or *problem-situations*, in Popper's phrase), it is really in the appraisal of problems and our tentatively suggested solutions that we make any progress: "Science may be regarded as a growing system of problems, rather than as a system of beliefs". (Popper, 1996, p. 103)

Critical rationalism and social psychology: a short history

Previous Attempts to Introduce Popper to Social Psychology

Historically, the lack of influence of critical rationalism on social psychology is most likely connected to the fact that the latter by and large originated in the USA – the country to which the surviving members of the positivist 'Vienna Circle' of philosophers of science fled the Nazi terror in Germany and Austria (see Creath, 2014), whereas Popper emigrated first to New Zealand and then to the UK. Social psychology established itself as an independent scientific (sub-) discipline at some time between Floyd Allport's 'social psychology' in 1924 and Lindzey and Aronson's 'handbook of social psychology' in 1954 (Danziger, 2000). During this time, positivism was the preeminent theory of science in the USA; the first English version of Popper's seminal 'logic of scientific discovery' was published only in 1959.

Of course, we are not the first authors to notice a lack of influence of critical rationalism on social psychology and there were at least two noteworthy examples of attempts to introduce Popper to social psychology by renowned researchers: One by Paul E. Meehl focusing on research methods and statistics and one by social psychologists Tom F. Pettigrew focusing on social psychological theories.

Paul E. Meehl. Popper's critical rationalism was discussed by Meehl (e.g. 1967; 1978; 1990) in his criticism of null-hypothesis significance testing. Whereas the 'abuse' of

significance tests for (inductive) statistical inferences had been criticized before (e.g. Rozeboom, 1960; Bakan, 1966), Meehl explicitly claims that null-hypothesis testing is not compatible with falsificationism. In his earlier papers (1967; 1978), he argued that whereas in the ‘hard sciences’ (such as physics and chemistry) more exact measurements lead to better chances to refute a theory, because theories make precise numerical predictions (which can easily be shown to be ‘false’), the opposite is true for ‘soft sciences’ such as social psychology where theories tend to take the form of postulating only that an independent variable X has a measurable (causal) effect on a dependent variable Y . Here, increasing measurement accuracy (or very large sample sizes) e.g. when comparing a treatment and a control group in a ‘classical’ social psychological experimental research design, will in the long run almost inevitably lead to one group differing significantly from the other. The only chance to refute the theory in question is if the researcher finds a significant difference between the groups in the opposite direction of the original prediction. Therefore, even a ‘nonsensical’ theory has a 50% chance of being corroborated (or refuted) given infinite accuracy or sample size. Hence, null-hypothesis tests do not put theories in grave enough danger of refutation.

With regard to the focus of this paper on the difference between ‘verificationism’ (or inductivism) and ‘falsificationism’, we will not discuss in depth the statistical implications of Meehl’s criticism. However, it is interesting to note that Meehl’s 1967 and 1978 papers triggered one of the relatively few elaborate debates on the appropriateness of Popper’s ideas for the ‘soft sciences’ such as social psychology. For example, Serlin and Lapsley (1985) criticized Meehl for adhering to a rather “naïve” (p. 76) version of methodological falsificationism.

Meehl (1990) took up the criticism and tried to show more ‘Lakatonian’ (cf. Lakatos, 1978) statistical ways to submit theories to a substantial risk of falsification without ignoring

the difficulties to disentangle theories and auxiliary hypotheses. Although again we will not discuss in detail the statistical and methodological consequences, it is still important to keep in mind that Meehl as well as his critics Serlin and Lapsley agreed on the underlying problem: The soft sciences such as social psychology are not exposing their theories to grave enough danger of refutation to ensure the growth of knowledge.

Thomas F. Pettigrew. Another line of criticism of social psychology's epistemology and practices addressed the lack of 'bold theories' that can be tested and falsified in a Popperian sense at all. This claim was put forward by the social psychologist Thomas F. Pettigrew (1991). Pettigrew identifies the "... absence of generic theory in social psychology that links the various levels of analysis ..." (p. 20) as the "... fundamental weakness ..." (ibid.) of social psychology. Whereas Popper regards the replacement of 'narrower' theories by theories with a greater empirical content (by means of falsification) as the core principle underlying the growth of scientific knowledge, social psychology seems to prefer the opposite way, namely to "... be pursued in ever narrowing spirals that increasingly specify the mediating or moderating processes of one particular and limited phenomenon" (p. 21). Pettigrew regards the theories of social psychology as rather 'timid' and not 'bold' in the sense that they offer a "... rich and falsifiable content" (p. 23); instead they are "... patched up" (ibid.) to withstand refutation attempts and criticism. He urges social psychologists to "... go beyond these formulations and pursue Popper's contention that we will learn far more from having our bold theories falsified than we will from failing to falsify narrow conceptions" (ibid). In his "final word" (p. 24), he expresses the hope that these new 'bold theories' could come from a convergence of the three different branches of social psychology he had identified beforehand: 'mainstream' experimental social psychology, symbolic interactionism (comprising of what is often called 'constructionist' or 'discursive' approaches in social psychology textbooks), and the more pragmatic (or pragmatist) applied branch of

social psychology, which does not share the other two branches rather dogmatic stance towards research methods and research designs (with the mainstream advocating experimentation and the ‘second stream’ employing what is usually called ‘qualitative methods’).

Towards a critical rationalist social psychology

The Need for a ‘Falsificationist Turn’

One may now ask what a critical rationalist social psychology should or would look like, but this is the wrong question. Popper did not have a vision of a ‘perfect’ science but only discussed principles that are necessary to ensure the growth of knowledge:

The creation of new ideas, of new theories, is partly non-rational. It is a matter of what is called ‘intuition’ or ‘imagination’. But intuition is fallible, as is everything human. Intuition must be controlled through rational criticism, which is the most important product of human language. This control through criticism is the rational aspect of the growth of knowledge and of our personal growth. It is one of the three most important things that make us human. The other two are compassion, and the consciousness of our fallibility (Popper, 1979, p. 167).

We firmly believe that social psychology would greatly benefit from more openness to criticism and the consciousness of our fallibility (and compassion as well, but the lack of it is arguably not restricted to the field of social psychology). It should be noted that in other scientific disciplines, for example in the field of physics, researchers seem to be more reluctant to speak about ‘empirical proof’ than they are in social psychology (see e.g. Hawking, 2001, p. 31). Given psychology’s wide scope – the thoughts, feelings, and behavior of human beings and the ‘unfortunate’ propensity of human beings to be less inclined to behave according to mathematical functions than the inanimate ‘natural world’ – we think that

psychology would benefit from another concept that Popper emphasized very much in his later writings, *humility*.

When we started discussing our ideas with fellow psychologists, some colleagues felt somewhat threatened by the arguments we put forward. Their main point of concern was that they ‘wouldn’t be allowed’ to do experiments anymore and would have to completely change their research habits. This is a misconception. In a Popperian epistemology, experiments are of crucial importance. The only difference is that you should not use them to prove something; yet, they are an excellent means to show inconsistencies between theoretical premises and observable events. In our opinion, the practice of social psychology would not change drastically after a ‘falsificationist turn’. Research methods are welcome as long as researchers adhere to the ‘control through criticism’ principle and keep a falsificationist mindset insofar as they are required to constantly challenge their assumptions, to look for better solutions for the problems they face than the ones they have at hand, and to always look for ways to refute their ideas rather than to prove them. On a side note, we agree with Pettigrew (1991) that these principles hold for most of what is often called ‘qualitative research’ as well, but this discussion is beyond the scope of the present paper.

More humility seems also to be desirable for improving the relationships between social psychology and its neighboring disciplines such as social philosophy, sociology, and political science. Statements such as “As experimental scientists, we test our assumptions, guesses, and ideas about human social behavior empirically and systematically rather than relying on folk wisdom, common sense, or the opinions and insights of philosophers, novelists, political pundits, our grandmothers, and others wise in the ways of human beings” (Aronson, Wilson, & Akert, 2010, p. 37) represent pretty much the opposite of what Popper was aiming at, and teaching this version of the ‘scientific method’ to our students will not

likely make them compassionate human beings with a critical mindset and an awareness of their own fallibility.

‘Hubris’ seems to be uncalled for in light of the aforementioned present ‘crisis of confidence’ (Pashler & Wagenmakers, 2012) in social psychology. The crisis is threefold: (1) some well-known protagonists of experimental social psychology have been accused of scientific fraud, (2) a number of social psychological experiments published in respectable scientific journals cannot be replicated, and (3) given that Bem managed to obtain experimental evidence for the ability to ‘feel the future’ (2011), one could draw the conclusion that if one really wants to do so, one can prove any random theory using the established social psychological methodology. Or in Popper’s words: “It is easy to obtain confirmations, or verifications, for nearly every theory—if we look for confirmations” (1963, p. 47). We argue that critical rationalism could help to overcome this crisis.

Critical Rationalism and the ‘Crisis of Confidence’

The first point is maybe the most difficult one to overcome. In a critical rationalist science as well, researchers have certain expectancies towards experimental results (in Popper’s words: *prejudice*) and there are empirical results which are ‘more profitable’ for a researcher’s career than others. Hence, fraudsters can be found in the hard sciences including physics as well. Nevertheless, it is interesting to note that Diederik Stapel emphasized in explaining what made him use fraudulent research practices in a number of scientific papers that in social psychology one needs to obtain ‘perfect results’ to get papers published in top tier journals (Battacharjee, 2013). ‘Perfect’ means that the results mirror as exactly as possible the researchers’ predictions and support or ‘prove’ their theory. One is tempted to assume that in this case the aforementioned ‘idol of certainty’ may facilitate the use of questionable research practices.

In view of the replicability crisis, a critical rationalist turn would definitely help a lot. If a theory or a theoretical assumption does not even manage to ‘survive’ well-meaning verificationist replication attempts, it probably can easily be refuted if research aims at falsification. In view of the relatively small empirical content of these micro-theories in question (cf. Pettigrew, 1991), the application of the principle of preference for higher empirical content would lead to a quick revision, anyway. Hence, whereas the methodological changes would not need to be dramatic, social psychologists would probably have to part with a number of mini- and micro-theories or would have to rephrase them as ‘effects’ that are in need of explanation by more comprehensive and ‘bolder’ theories.

Of course, the ‘Bem-crisis’ would disappear instantly. Instead of discussing ‘empirical evidence’ – irrespective of how it was obtained – Bem would first be asked to formulate a generative and explanative theory of precognition which allows for conjectures and empirically testable hypotheses over and above the specific setting used in his experiments. There is good reason to believe that these conjectures could be consequently refuted, assuming that there is no such thing as precognition, which seems likely given the fact that casinos all over the world are still able to make a profit off the gamblers’ inability to guess the right numbers, cards, etc.

Conclusion

Social psychology is facing a serious crisis, and we believe it is fair to say that a persistent belief in positivism is a contributing factor. Psychology should not take pride in the fact that in scientific articles from this field hypotheses are more often ‘confirmed’ than in any other field of science (Yong, 2012). We think that a falsificationist turn, consisting in the acknowledgement of critical testing as the only known way to increase unified knowledge and a heightened awareness of the fallibility of all knowledge, is needed. As pointed out, in terms of research methods, not much would change – except for the fact that experimental

social psychologists would be asked to show more humility in accepting that ‘proving’ something empirically is not possible and that setting out in scientific inquiries to confirm a theory of hypothesis is misguided and erroneous. It is not observation, neither evidence and its collection, that is at fault but what use these are put to: whereas evidence can never be used to (logically) infer theories from, it *can* be used to critically test them. Accepting this falsificationist approach and applying it consistently means acknowledging that a critical mindset and continuous improvements in our theories are the only principles by which the growth of knowledge is possible.

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