Combined Methodology of the Natural and Social Sciences

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Abstract: By combining the methodologies of Max Weber, Karl R. Popper, and Alfred Schutz, it is possible to solve the shared problems of the natural and the social sciences (the Kantian Problem) as well as the specific problems of the social sciences (the Cartesian Dilemma). Max Weber introduces a criterion of logical consistency and consistency of the meaning structure of scientific explanations and conclusions derived out of ideal-types. This is the absence of theory-internal contradictions. Karl Popper demanded that theories be "falsifiable" and that they survive the test against reality. This is the absence of external contradictions between theory and reality. However, Popper's problem is that a theory can only be falsified if the scheme of interpretation used is appropriate. Alfred Schutz offers the solution to this problem. He explains the possibility of an intersubjective understanding. Adequate schemes of interpretation can be constructed if they are based on a (culturally specific) general life-world.
Key words: Methodology, Max Weber, Karl R. Popper, Alfred Schutz, Kantian Problem, Cartesian Dilemma, Ideal-types, Falsification, Adequacy

In the social sciences, two methodological traditions exist. One states that there are no significant differences between the methods of natural and social sciences. This tradition is nowadays mainly supported by economists. On the other hand, a second group advocates the standpoint that the social sciences deal with specific problems that demand a specific methodology for the social sciences independent of the natural sciences. This position is mainly supported by macro-sociologists and interpretative micro-sociologists. I wish to delineate in this paper shared methodological problems of the natural and the social sciences (the Kantian Problem) and specific problems of the social sciences (the Cartesian Dilemma). I will discuss the different solutions of Max Weber, Karl R. Popper, and Alfred Schutz, and I will show that a combination of their methodologies can solve the Kantian Problem as well as the Cartesian Dilemma.

1. Kantian Problem and Cartesian Dilemma

The Kantian Problem and the Cartesian Dilemma are two closely related problems. Both deal with the relationship between theory and reality, or to put it in a different way, with the problem of understanding experienced facts or assumed ideas. However, only the Kantian Problem is a problem of the sciences in general, whereas the Cartesian Dilemma is a specific problem of the social sciences. Nevertheless, both problems share the same background problem: the *qualitative and quantitative infiniteness and—as a result—the chaotic nature of reality.* Two problems are involved here. First, the relevant aspects of reality have to be selected.

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It is possible neither to see all elements of reality, nor to perceive all facets and details of a single element, because of this infiniteness of reality. And, second, these selected aspects have to be connected in such a way that they make sense of the perceived situation, in order to bring structure to the chaos. I will call the connections between selected aspects a *theory*. A theory has therefore two functions: it not only defines the relevant aspects of reality for the perception, but it also explains the perceived things. But how do we know that we have chosen a correct or adequate theory? How can we be sure that our perception of a situation has anything to do with the real situation, if every perception of reality depends on *our* theory? I will call this problem the *Kantian Problem* in a wider sense. It is the problem of finding a criterion or a procedure which allows us *to eliminate wrong theories or perceptions of reality*. The Kantian Problem in a narrower sense is the problem of defining a differentiation criterion which *separates the empirical sciences*—which can be checked by experience—*from mathematics, logic, and "metaphysical" systems*—which cannot be checked by experience (Popper 1989: 9 and 255). Especially important is the differentiation between empirical and "metaphysical" statements, because only the former have a valid status in science. Only through the opportunity to test them against reality is it possible to show that they are free of contradictions, if they survive the test (Popper 1971: 38).

These problems are equally relevant for the natural and the social sciences. However, the social sciences have to deal with an additional problem. The object of research in the social sciences is phenomena caused by human actions. And human actions are not just a result of an adaptation to environmental changes. They depend also on the actors' interpretation of the situation and on their motives. Culture and ideas have an immense impact on human behavior. None of this is a problem in the natural sciences. Objects of the natural sciences simply adapt to environment changes. Atoms and molecules do not think—humans do. It becomes obvious that in the social sciences it is not only important to perceive the relevant aspects, but also to interpret these relevant aspects in an adequate way. But not only every perception (what is relevant?) but also every interpretation (what is the meaning?) depends on a "theory". I will call this theory *a scheme of interpretation*. A scheme of interpretation has the function of defining concepts of the second order dependent on the actors' first-order concepts of motives, social situations, and all other relevant cultural elements. But how do we know that we have chosen a correct or adequate scheme of interpretation? How can we be sure that our interpretation of a perceived situation has anything to do with the interpretation of the same situation by the actors, if every interpretation of the actors' social reality depends on our scheme of interpretation? Grathoff (1978: xxf.) called this problem the *Cartesian Dilemma*. It is the *problem of intersubjectivity*—the problem of finding a procedure that *enables us to interpret a situation in the same way as the actors*, although their subjective motives and intentions exist only in their stream of consciousness, and never in ours.

2. Weber's solution: causal explanation and motivational interpretation

The first integrated solution to the Kantian Problem and the Cartesian Dilemma was provided by Max Weber (1864-1920). Weber was a German economist and historian. His methodological thinking was mainly influenced by the "Methodenstreit" in economics between the leader of the German historical school Gustav Schmoller (1838-1917) and the leader of the

Austrian school of economics Carl Menger (1840-1921). This debate about the correct methods started in 1883 after Menger's strong attack on Schmoller's historical school. Menger proposed an economic approach as a pure theory, which should be based on general universal concepts of human action, antecedent conditions, and a deductive method. Schmoller on the other hand argued for an economic approach based on concrete historical facts on the macro level, and an inductive method (Fusfeld 1987: 454; Prendergast 1986: 22). Weber had an intermediate position in this debate. He was a student of the German historical school who had realized several severe methodological problems to this approach. His main critiques concerned the holistic ideas of analyzing an economy in totality (Weber 1985: 263f.; 1947: 6) and the essentialistic use of terms as if they had a real essence, and were not just a means of interpretation (Weber 1985: 208f.). But on the other hand he did not adopt the approach of Menger, although he evaluated Menger's work highly. His main problem remained all his life the explanation of concrete historical phenomena and not the construction of a pure theory, but he understood that in order to explain such phenomena, it is necessary to apply a pure theory.

I indicated above that Weber was offering a solution to both the Kantian Problem and the Cartesian Dilemma. However, this is only partly true. The point is that Weber does not clearly separate these two problems, although he discusses them both, and provides only one solution to both problems in the form of *ideal-types*. This is the reason the modern interpretations of Max Weber's methodology are contradictory. Some sociologists read him as a positivist (only realizing the Kantian Problem) and some as an anti-positivist (only assuming the Cartesian Dilemma). But Weber's ideal-types are a theory as well as a scheme of interpretation. They define the relevant aspects of reality. They are a scheme of interpretation for an accurate understanding of observed people's behavior. They explain relevant interpreted aspects of a real phenomenon by connecting them in such a way that they make sense (Cavalli 1994: 228). Therefore both the Kantian Problem and the Cartesian Dilemma are involved. These two methodological problems are also the reason for Weber's differentiation of two concepts of causality. The first concept of causality is identical with the application of a causal law in the natural sciences, whereas the second concept is a unique concept of the social sciences related to the motivational analysis of human actions (Weber 1985: 134f. and 361). I will call the first concept the *concept of "objective" causality*. It describes the situational or environmental fixation of all real objects. An example of an "objective" causal relation in the natural sciences is the dependence of the state of an aggregate of water on temperature. If the temperature decreases from 5°C to -5°C, then the aggregate of water will change from fluid to solid. An example of an "objective" causal relation in the social sciences is the dependence of a person's decision to buy apples or bananas on their relative prices. If an apple becomes more expensive than a banana (and the apple was cheaper the day before), and if this person has the perspective of a *homo oeconomicus* (i.e., he is comparing prices and maximizes his utility), then he adapts to the price changes and buys the banana instead of the apple (if he has no clear preference between apples and bananas for the same price), even though he had bought the apple the day before. By comparing these two examples from the natural and social sciences, it becomes obvious why the social sciences are more complicated than the natural sciences. An hypothesis about an "objective" causal relation in the social sciences always

includes an hypothesis about the perspective of the relevant actors: their definition of the situation and their motives. This is the reason Weber introduced the second concept of causality in the sense of an action caused by a motive. This concept describes the motivational dependency of the behavior, which I will call the *concept of "subjective" causality.*

The behavior of real actors is therefore determined 1) by their motives (the "subjective" causality) and 2) by the environmental or situational influences (the "objective" causality), and is 3) dependent on the actor's definition of the situation (based on ideal-types). A behavior makes sense for the actor, if it follows out of the "subjective" and "objective" causal considerations and can be described as a subjective meaningful behavior for this situation. According to this characterization of human behavior, Weber (1947: 1) defines "*sense*" *(»Sinn«[1])* on the one hand as the *real reason* for a behavior of either a single actor ("subjective" causality) or an average of actors ("objective" causality) or on the other hand as in terms of *constructed pure types* of the actor's subjective meaning (the ideal-types). These three meanings of the concept of "sense" refer to the actor's perspective. If a researcher wants to *understand (»verstehen«)* an observed behavior or social phenomenon, he has to determine all three types of "sense" connections. He has to interpret the motives of a concrete historical actor, to explain the causal laws or the situational dependency of the average actor's behavior, and to construct an ideal-typical meaning structure of a phenomenon's pure type (Weber 1947: 4). But not all three *sense attributions (»Sinnzuschreibungen«)* made by the scientist are equally relevant for all research problems. Weber (1947: 9) defines sociology as the social science that deals 1) with the construction of typical concepts (the scheme of interpretation) and 2) with the search for the "objective" causal laws or with a general analysis of the situation (the theory). History, on the other the hand, is for him the social science that analyses the motivation-dependent causation of a concrete historical behavior or phenomenon. These three problems have to be solved in order. Sociology is therefore a prerequisite for an historical analysis. And the *construction of ideal-types* is therefore a prerequisite for the analysis of both "objective" causal laws and "subjective" motivational causation (Weber 1985: 111). Ideal-types cannot be derived out of an "objective" or "subjective" causal analysis, because every analysis of causality needs to apply a scheme of interpretation (Weber 1985: 175). Ideal-types are not hypotheses about objective reality, but they are useful for building such hypotheses. They do not describe the objective reality, but they are an unequivocal means of expression for the description of the perceived reality (Weber 1985: 190).

As a result, the ideal-types have to be constructed first, and independent of the search for causal laws and of the analysis of an historical phenomenon. The two problems of the causal analyses are more complicated, because they not only need the already constructed ideal-types but are also dependent on each other. Weber (1947: 5f.) defines a *sociological rule or law* as a phenomenon that can be described with ideal-types (it has to be a meaningful phenomenon) and can be observed regularly in reality (it has to be statistically relevant). Furthermore, a phenomenon can be observed regularly, if it is determined by both principles of causality: by the "objective" changes of the environment and by the "subjective" motives of the relevant actors (Weber 1985: 436f.). But this realization brings the empirical researcher into trouble. A *test of an "objective" causal relation* between variables is only possible if other variables can be controlled or

if at least their variations can be measured. This is the only way to determine a correlation between an explaining and an explained variable. This means that the motives of an actor and his definition of the situation have to be controlled or measured, in order to test a hypothesis about an "objective" causal relation between situational changes and the actor's behavior: for example, the connection between price changes and the actor's decision to buy apples or bananas. This is why Weber (1985: 129) proposed as a research strategy to start with the *assumption of end-rational action* for the analysis of the "objective" situation by means of nomological knowledge. The more end-rational the actors behave, the more similarly they will react to the situation (Weber 1947: 15). However, for Weber, the assumption of end-rationality is not a natural law but a scheme of interpretation which is helpful for the analysis of "objective" causal laws (Weber 1985: 130). It is not the aim of sociology to construct end-rational models, but they are often the most useful means for the analysis (Weber 1947: 3). And contradictions between reality and a hypothesis – about the action's dependency on situational factors – based on the end-rationality assumption do not lead in every case to a falsification of the hypothesis, because contradictions can be the result of a wrong hypothesis or an inadequate end-rationality assumption. Therefore a reexamination of the actor's motives becomes necessary after contradictions between reality and the hypothesis occur (Weber 1947: 2f.; 1985: 130f. and 432). The end-rationality assumption has to be verified (Weber 1985: 100 and 437f.).

The aim of an historical analysis of a concrete phenomenon, on the other hand, is to describe how this phenomenon came about as a result of human actions, and how these actions were caused by specific motives. But although the *main interest of an historical research* lies in the *motivational analysis*, Weber (1985: 6 and 68f.) states clearly that the sociological causal laws also have to be applied. However, an historical analysis is for Weber a problem of "sense attribution" of subjective motives to an observed action and not a problem of finding or proving "objective" causal laws (Weber 1985: 178). Finally, it is necessary for an explanation of a concrete historical phenomenon to determine the causes of the human actions which were producing this phenomenon. And these actions were caused by the "objective" situational factors (e.g., prices) as well as the actor's motives (e.g., end-rationality) and definitions of the situation (e.g., the perspective of a *homo oeconomicus*). Neither an application of proved statistical correlations between two variables alone (Weber 1985: 70) nor an exclusive analysis of the motives which caused the observed behavior (Weber 1985: 179) are sufficient for an historical analysis. Only these two methods combined can explain a concrete phenomenon accurately.

The methodological ideas of Max Weber related to the different perspectives of actor and researcher on the one hand and to the different research problems in sociology and history on the other hand can be summarized in the following way:

A. "Sense connections" (»Sinnzusammenhänge«) for the actor (reality)
situational dependency (from the situational conditions to the action): $y1 \Rightarrow x2$
motivational dependency (from the motive to the action): $m1 \Rightarrow x2$
life-world concepts mi, yi, xj and the definition of the situation: $s1 \Rightarrow m1, y1, x2$ (meaning)

B. "Understandable sense attribution" (»Verstehende Sinnzuschreibung«) by the scien-

tist (theory)

1) as a sociologist (theory building)

a) concept definitions

clarification of ideal-typical concepts M, Y, X and their relations Y⇒X, M⇒X

b) analysis of the situation

explanation of the situation-dependent causal relations (Y⇒X)
by applying the provisional end-rationality hypothesis
by using ideal-typical concepts

2) as an historian (theory application)

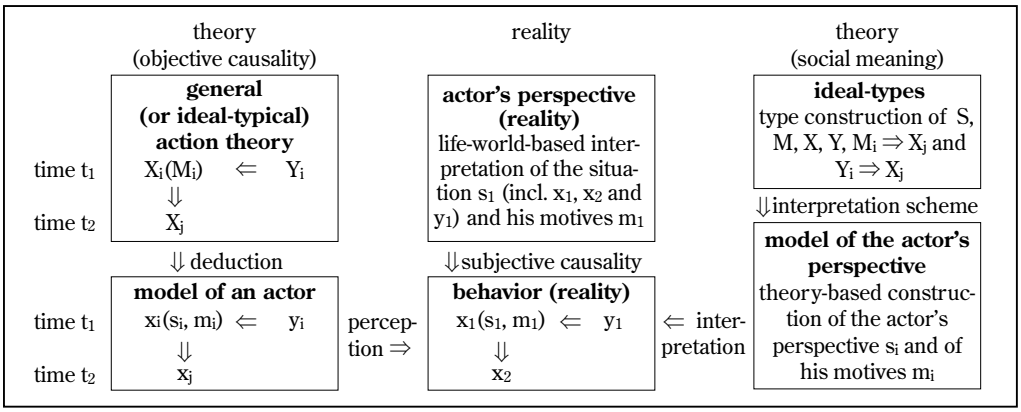
analysis of the motives

explanation of the motivation-dependent causation of a concrete phenomenon (M⇒X)
by applying situation-dependent causal laws
by using ideal-typical concepts

Returning to the *Kantian Problem* and the *Cartesian Dilemma*, I have already mentioned that Weber considered the concept of *ideal-types* as a *solution* to both problems. Starting from Kant's reflections that every perception as well as every interpretation is dependent on a theory or a scheme of interpretation (Weber 1985: 126 and 170), Weber concluded that arbitrary statements about reality can only be limited if the researcher's freedom in his "value" judgments is restricted. This is the function of Weber's concept of ideal-types: the restriction of arbitrary judgments, by forcing a researcher to define a clear scheme of interpretation and a theory at the beginning of his research, which again allows other researchers to understand his perceptions and interpretations of reality as well as his conclusions (Weber 1985: 121f., 503, and cf. 195). However, the selection of a research topic and the construction of ideal-types cannot be restricted (Weber 1985: 182). Every arbitrary choice of a theory or scheme of interpretation is acceptable for Weber, as long as after making this choice the researcher follows the norms of scientific investigation (e.g., logic). Therefore it is possible to consider the results of scientific studies as objective, even though all scientific studies depend on subjective relative "value" judgments in the form of choices of a research topic and a theory (Weber 1985: 183f.; Cavalli 1994: 228). *The use of ideal-types can avoid arbitrary explanations of "objective" or "subjective" causal relations, but an arbitrary choice of the ideal-types cannot be avoided* (Weber 1985: 193). Weber's solution to the Kantian Problem and the Cartesian Dilemma is therefore the *criterion of internal consistency* of an argumentation. Once a theory about the "objective" causal laws (the Kantian Problem) and a scheme of interpretation for the "subjective" motivational causation of an action (the Cartesian Dilemma) are arbitrarily selected, the explanations and conclusions have to be consistent with this theory and scheme of interpretation. That means that the explanations and conclusions have to be intersubjectively verifiable. In Table 1, Weber's solution for the Kantian Problem and the Cartesian Dilemma for the understanding of human behavior is summarized. First, a researcher has to choose ideal-types, and with these an ideal-typical action theory. Second, these ideal-types can be used as a scheme of interpretation for the modeling of an actor's perspective, which determines the actor's definition of the situation and his motives (the Cartesian Dilemma). Third, a concrete model of

this actor's dependency on the specified "objective" situational factors can be deduced out of the general action theory, which, fourth, determines the perception of the observed concrete historical behavior (the Kantian Problem). In this way, ideal-types determine the perception (what is relevant?) and the interpretation of the perceived elements (what is the meaning?). Max Weber is therefore able to offer a solution to both the Kantian Problem and the Cartesian Dilemma.

Table 1: Weber's solution of the Kantian Problem and the Cartesian Dilemma for the understanding of human behavior



However, it is questionable whether the *criterion of internal consistency* alone can solve the Kantian Problem and the Cartesian Dilemma. It is certainly *a necessary criterion, but* unfortunately *not a sufficient* one. Explanations and conclusions based on "metaphysical" systems can also be derived in a consistent way. The problem with Max Weber's approach is that every arbitrary choice of a theory is acceptable. But obviously neither every theory about the actor's "objective" dependencies on situational factors nor every scheme of interpretation for the "subjective" motivational causation of a behavior are correct or adequate. Max Weber did not provide any further criterion to exclude such incorrect or inadequate theories or schemes of interpretation. However, Karl Popper and Alfred Schutz did furnish further criteria.

3. Popper's solution: falsification of causal hypotheses

The second solution of Karl Raimund Popper (1902-1994) refers only to the Kantian Problem, as he rejected the Cartesian Dilemma completely. Popper was an Austrian philosopher, mathematician, and physician. His methodological work can be interpreted as an attack on all philosophical traditions that are based on subjective experience or perception, such as classical empiricism, idealism, positivism, phenomenalism, sensualism, and phsychologism, including the behavioristic variants. His aim is to replace the criterion of the "ability to experience (perceive)" something with a criterion of "testability" (Popper 1989: 76). Following on from these philosophical considerations, Popper extended his critique to all forms of historicism in the social sciences, including the German historical school. Like Weber, he was mainly attacking the

holistic (Popper 1987: 61f.) and essentialistic (Popper 1987: 107) ideas of historicism. The similarity of Weber's and Popper's position referring to the historical school is no surprise, because both their methodologies are based on Kant and his basic assumption of the infiniteness of reality. Any research strategy which tries to analyze a phenomenon in totality must therefore fail. However, Popper went much further than Weber in his rejection of the essentialism of the historical school, because he did not only exclude intellectual intuitions about the essence of a phenomenon, but also all forms of interpretations, because they failed to fulfill for him the "testability" criterion (cf. Popper 1987: 118).

Popper's solution to the Kantian Problem in the narrower sense is the "testability" or "falsifiability" criterion. Popper's methodology starts with the insight that an inductive strategy – a strategy to induce out of subjective experiences more and more abstract theories – can never prove the truth of a theory (Popper 1989: 3). The problem is that an inductive strategy cannot be logically justified without leading into an infinite regress, because the introduction of the induction principles has to be the result of an inductive conclusion (Popper 1989: 4f.). But with the inductive strategy the verification approach also fails – an approach to confirm an hypothesis by showing the correspondence to the experienced reality (Popper 1989: 14). A practical example will make the impossibility of the verification approach clear. The hypothesis that glass conducts electricity can hardly ever be completely verified, because glass is a composite of different materials, which exist in infinite variations. It is therefore never possible to verify this hypothesis for all variations of glass. Instead of the verification approach, Popper offered as an alternative the *method of falsification*. A theory can be falsified if a prognosis deduced out of the theory does not stand the test against reality (Popper 1987: 104). Only in this case does the researcher know that a theory is wrong. But if a theory survives the test, it is not allowed to conclude that the theory is true, because it still can be falsified in the future (Popper 1989: 15). An "objective" causal explanation consists of two types of sentences: general sentences – hypothesis or natural law – and specific sentences – situational or initial conditions – which are only given in a concrete situation (Popper 1989: 31f.). Out of a combination of general and specific sentences a prognosis can be derived, and it can be tested, if there are contradictions between the projected result and the basic sentences – statements about singular facts. But contradictions alone are a necessary but not a sufficient criterion. Accepted basic sentences falsify a theory only if the singular facts stated in the basic sentences can be repeated and if they can be causally explained by an alternative hypothesis (Popper 1989: 54f.). Based on this considerations, Popper defined the *criterion of "falsifiability"* as the solution to the Kantian Problem in the narrower sense. The criterion to distinguish "empirical" from "metaphysical" systems of sentences is their chance to fail a test against reality (Popper 1989: 14f.). A theory can be called "empirical" or "falsiable" if a theory forbids specific observable phenomena (e.g., the theory of the preservation of energy forbids a *perpetuum mobile*), or, stated in a different way, if a possibility exists that contradictions between a theory and basic sentences can occur (Popper 1989: 53). It is important to realize the difference between the "falsifiability" criterion and the method of falsification (Popper 1989: 425f.). The question of whether a theory is "falsifiable" is a logical problem (the Kantian Problem in the narrower sense). Only if a theory forbids a class of phenomena is it "falsifiable"; whereas

the question of whether a theory is falsified is an empirical problem (the Kantian Problem in the wider sense). Only if some of the forbidden phenomena can be repeatedly observed is a theory then falsified. Popper's solution of the Kantian Problem in the natural sciences is summarized in Table 2. A researcher has first to formulate a general theory by using general sentences (e.g., molecules are reacting to temperature changes) which forbid specific phenomena. Out of this general theory a concrete model related to a specific object can be deduced (e.g., water reacts to temperature changes). This model determines the perception of reality by defining the relevant aspects (Popper 1989: 76). By adding specific sentences about the situational conditions (e.g., a temperature change from 5°C to -5°C) to the model, a prognosis can be deduced (e.g., the aggregate of water changes from fluid to solid). The projected result can then be compared with the basic sentences about reality. If contradictions occur, then the general theory would be falsified.

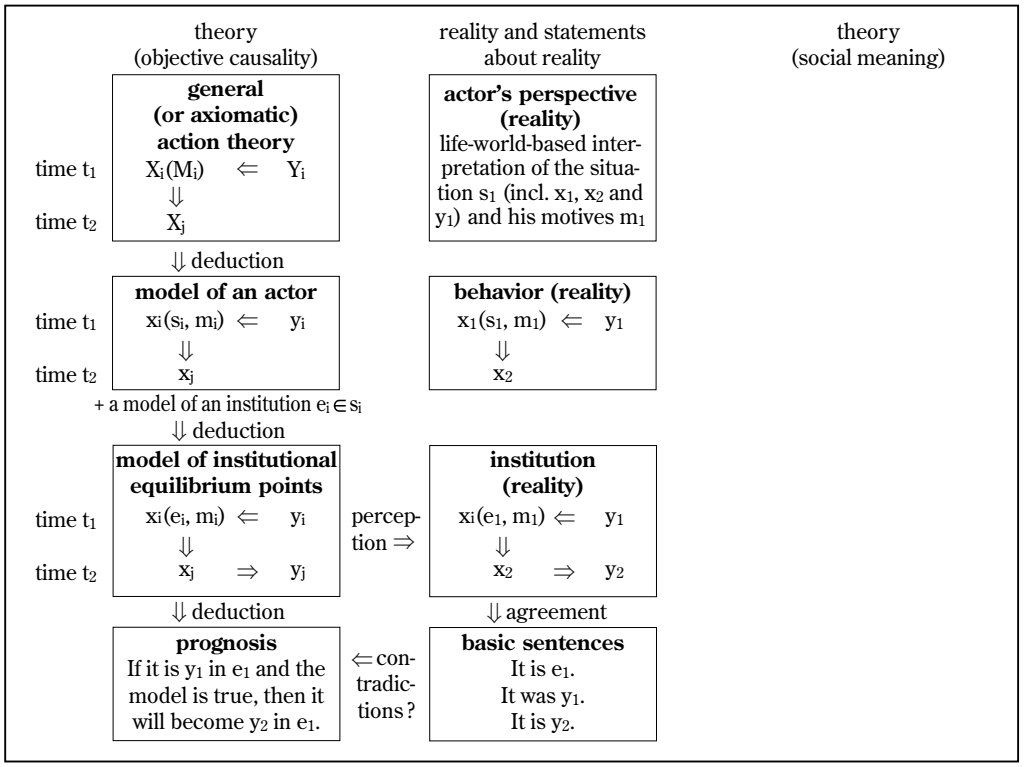
Table 2: Popper's solution for the Kantian Problem in the natural sciences

	theory (objective causality)		reality and statements about reality	theory (social meaning)
time t_1	**general theory** $X_i \Leftarrow Y_i$ ⇓			
time t_2	X_j			
	⇓ deduction			
time t_1	**model** $x_i \Leftarrow y_i$ ⇓	perception ⇒	**reality (singular fact)** $x_1 \Leftarrow y_1$ ⇓	
time t_2	x_j		x_2	
	⇓ deduction		⇓ agreement	
	prognosis If it is x_1 (y_1) and the model (law) is true, then it will become x_2.	⇐ contradictions?	**basic sentences** It was x_1. It was y_1. It is x_2.	

The interesting question is now how basic sentences in the sense of statements about reality can be formulated in Popper's methodological system, if the subjective perceptions of reality are rejected as a non-empirical method (Popper 1989: 60). Of course, Popper admitted that facts can only be recorded through observations, and in this sense they are based on the subjective perception of reality. But what he rejected was the idea that subjective perceptions of reality can justify the validity of sentences (Popper 1989: 64). For Popper (1989: 73), the validity of basic sentences can only be intersubjectively justified by an agreement or a consensus of the observers about the perceived facts, although from a logical point of view, such an arrangement is just arbitrary (Popper 1989: 74). If such an arrangement cannot be accomplished because not all the observers can accept a statement about the perceived phenomenon, then the falsification approach and the empirical sciences in general will produce no results (Popper 1989: 69). Where the language fails, science will become impossible (Popper 1989: 70). To avoid this problem, Popper proposed to reduce the complexity of the basic sentences, because it would be easier to

accomplish a consensus about simple matters. For example, the freezing of water could be stated in three singular It-is sentences: "It is water in a fluid aggregate." "It is a temperature change from 5°C to -5°C." "It is ice or water in a solid aggregate." Popper furthermore demanded that basic sentences should only describe observable phenomena, because only these phenomena can be intersubjectively re-examined (Popper 1989: 68). This is in my opinion the reason Popper preferred quantitative over qualitative evaluations (Popper 1987: 111f.). Qualitative judgments are dangerous, because the margin of interpretations is normally too high. And interpretations in general are too easily misguided by concepts. For example, the basic sentence "This swan is white" is observable, but probably we only call this swan "white" because we have called the animal a "swan", and as Kant and Weber said, every interpretation is based on a scheme of interpretation (Popper 1989: 377f.). But to achieve a consensus about the basic sentences, such subjective interpretations or intuitions have to be avoided. This is the reason not only for the rejection of the essentialism in historicism but also the denial of the Cartesian Dilemma, which Popper (1989: 253) described as a fictitious problem.

Table 3: Popper's solution for the Kantian Problem in the social sciences



As a result of the denial of the Cartesian Dilemma, Popper (1987: 103) came to the conclusion that no differences in the methods of the natural and the social sciences exist. And to avoid the need to interpret the actors' motives as well as their definitions of the situation, he proposed to start with the assumption of rational actors (Popper 1987: 110f.) and with the analysis

of institutions (Popper 1987: 123f.). Here Popper's methodology is clearly influenced by economics. Economists explain macro-phenomena as the unintended results of human actions, but such causal explanations are not based on real observed actors but on assumed rational actors, and these assumptions are nearly never tested independently. What economists test empirically are prognoses about institutional equilibrium points. Such an analysis is possible because economists deal with specific institutions: the markets. In markets, the relevant variables (e.g., quantity and prices) can be measured in a quantitative way, which again fulfills Popper's prerequisite for the "falsifiability" criterion. Table 3 shows Popper's solution for the Kantian Problem in the social sciences. It is obvious that although economic causal explanations are based on an action theory, this action theory cannot be falsified by contradictory basic sentences about the actor's motives but only by contradictory basic sentences about institutional equilibrium points, because the real actor's motives are never investigated.

This research strategy ultimately declares the actors' motives irrelevant – to define a variable as constant means to declare it as irrelevant. But social phenomena are dependent on the actors' motives and on their definition of the situation. And explanations that neglect important variables are without any doubt questionable. This neglect of an evaluation of important micro-variables furthermore leads in fact to an immunization of the economic theory, because contradictions on the macro-level never lead to a falsification of the theory. The effect of contradictions is mostly a re-formulation of the institutional model or in rare cases the introduction of specific preferences of the actors (e.g., altruism instead of egoism). But these ad-hoc changes render the economic theory tautological (Opp 1983: 211; 1989: 121; Fireman/Gamson 1979: 20f.; Tietzel 1985: 41; Braun 1998: 157), which stands in sharp contrast to Popper's basic methodological ideas.

In my opinion, Popper's methodology can only be applied in the social sciences if all relevant variables – which cause a social phenomenon – are analyzed, including the actors' motives and their definitions of the situation. If such variables are not included, then the complete social sciences have to be excluded from the empirical sciences – they would receive a "metaphysical" status. To avoid such a conclusion it is necessary to deal with the subjective unobservable variables. But this is only possible if qualitative interpretations are permitted. The use of qualitative interpretations based on definitions leads again to the problem of essentialistic definitions. These are the result of What-is-questions, for example, "what is matter?", "what is power?" or "what is justice?". The aim is to grasp the essence of these concepts by intellectual intuition. Essentialistic definitions are read from the beginning to the end: "power is the control of relative large resources" or "power is x". But how can we be sure that we have not grasped the wrong essence? For Kant and Popper the answer was clear: we cannot (Popper 1971: 11f. and 15). Nominalistic definitions on the other hand stand in sharp contrast to this essentialistic approach. Nominalists would formulate their questions thusly: "how does this piece of matter behaves?" It is a question of causality. As a result, nominalistic definitions have a less important status. Not the essence of completely defined concepts but rather the relations between more or less adequately defined concepts are important. Therefore nominalistic definitions are read from the end to the beginning: "power is called the control of *relatively* large resources" or "x is called the control of *relatively* large resources" (Popper 1971: 14). Finally what I call the fact that some people have

more resources than other people is not relevant. Concepts are no more than a useful means of analysis (Popper 1987: 23). "Scientific knowledge", for Popper (1971: 14), is independent of definitions. Furthermore, definitions cannot establish the meaning of a concept, because other words are used to describe this concept, which again have to be defined. This leads to an infinite regress (Popper 1971: 17). Concepts can never be defined accurately and they can never have the same status as "falsifiable" causal laws. But is Popper's standpoint even an adequate description for the use of definitions in the natural sciences? Let us examine a few of Popper's statements.

> "In science, we take care that the statements we make should never depend upon the meaning of our terms. […] A term like "sand-dune" or "wind" is certainly very vague. (How many inches high must a little sand-hill be in order to be called "sand-dune"? How quickly must the air move in order to be called "wind"?) However, for many of the geologist's purposes, the terms are quite sufficiently precise; and for other purposes, when a higher degree of differentiation is needed, he can always say "dunes between 4 and 30 feet high" or "wind of a velocity of between 20 and 40 miles an hour". And the position in the more exact sciences is analogous. In physical measurements, for instance, we always take care to consider the range within which there may be an error; and precision does not consist in trying to reduce this range to nothing, or in pretending that there is no such range, but rather in its explicit recognition." (Popper 1971: 19f.)

It becomes obvious why natural scientists have so little trouble with definitions. If they need to define a term, then they can refer to exact measurement scales like "feet", "miles" or "hours". But measurement scales are of course definitions. It makes a difference to measure in "feet" or in "meters". And how long one "foot" is has to be defined. The "scientific knowledge" of the natural sciences would be empty without definitions, because agreements about basic sentences would be impossible and therefore no falsification method could be applied. It seems to me that definitions are much more important in the natural sciences than Popper wanted to admit. However, measurement scales are not essentialistic definitions. They do not define the essence of one object but distinctions between different comparable objects on a continuum. But also qualitative scales can be defined analogously to measurement scales. The definition of different types of motives can be formulated based on a criterion for separating them, and not on their essence. For example, Max Weber's concepts of end- and value-rational action could be separated from traditional and affectual behavior by the criterion of "choice". Value-rationality could again be separated from end-rationality by the criterion of a "choice to eliminate choice in the future" in the sense of a separation of a "constitution" from a renewable "contract". Such definitions are arrangements of borders of terms and not of their cores (their essence). At the borders these concepts are ambiguous as a result of the margin of interpretation, but inside an interval they can be identified. It seems to be possible to define qualitative scales in a non-essentialistic way. However, one problem remains: the Cartesian Dilemma. How can we be sure that our interpretation of an actor's motive is correct? The answer is the same answer as for the Kantian Problem: the method of falsification. If a researcher observes a behavior, then he can ask the

actor if his behavior was caused by a specific motive. And the actor can agree with this hypothesis or not. If he agrees, then it means nothing, because a verification has no empirical status. But if he does not agree and if another alternative hypothesis could explain the observed behavior as well, then the hypothesis can regarded as falsified. Popper's methodology therefore goes too far and at the same time not far enough. It goes too far by rejecting the Cartesian Dilemma, which would lead finally to a reduction of the status of social sciences from "empirical" to "metaphysical". And it does not go far enough, because Popper did not extend the method of falsification to the Cartesian Dilemma. However, the extension of the falsification principle to the interpretation has an important effect. If the real actors were not questioned about their motives, then a theory cannot be falsified independent of the interpretation. If contradictions occur in such a case, then the theory could be wrong or the interpretation could be inadequate. A theory and a specific interpretation can only be falsified together in macro-studies. As a result, not only do we not know, as Popper stated, if a theory is correct, but we also do not know most of the time if a theory is wrong. The only thing we know is that we have a problem if contradictions occur. "Contradiction-freeness" seems to be the only useful criterion for separating provisional acceptable theories from provisional unacceptable theories. And this criterion of "contradiction-freeness" also includes Weber's criterion of internal consistency. Weber's methodology demands the absence of contradictions for internal logical or understandable derivations from the theory or the scheme of interpretation, which was also supported by Popper (1989: 59). Popper's falsification principle can be characterized as a demand of an absence of external contradictions between those derivations and the experienced reality.

4. Schutz's solution: life-world-based interpretation of motives

Alfred Schutz (1899-1959) offers a further solution for the Cartesian Dilemma. As the discussion of Popper's methodology showed, it is impossible to falsify a theory alone if the interpretation is not tested independently by questioning the real actors about their motives and definitions of the situations. However, it is also obvious that it is not possible in every study to question the real actors, because too many actors may be involved, or because they are already dead in the case of historical studies. In these cases, Schutz's methodological concept of »adequacy« can exclude inappropriate interpretations. Schutz was an Austrian lawyer, economist, and sociologist. As for Weber, his methodology is the result of the "Methodenstreit" in economics, but in contrast to Weber, who started from the historical perspective, Schutz's starting point was the Austrian school of economics. Schutz, in his attempt to defend the methodological position of the Austrian school, turned his attention to Max Weber. Schutz saw a solution for these methodological problems in Weber's concept of ideal-types and in his method of "understanding". But although both ideal-types and the method of "understanding" inspired him, he replaced them with his own concepts because of their shortcomings. For the clarification of Weber's method of "understanding", Schutz turned finally, influenced by Husserl's phenomenology, to the problem of the constitution of the meaning structure (Srubar 1994: 259f.). Schutz (1932: 276; Srubar 1994: 260f.) criticized Weber's concept of ideal-types as a solution for the Kantian Problem and the Cartesian Dilemma, because for him the position of a researcher is

principally equivalent to the position of an interpreting person in the world of contemporaries (»Mitwelt«). Both contemporary and researcher interpret an observed behavior based on a scheme under the assumption that the actor was also orienting his behavior on the same scheme. But if there is a link between the actor's scheme of orientation and the contemporary's or researcher's scheme of interpretation, then it seems to be inappropriate to allow the use of every arbitrarily selected scheme of interpretation as Weber supposed. Although Weber made a distinction between the "sense connections" of an actor's behavior and the "understandable sense attributions" of a researcher, he never discussed their relationship. Therefore Schutz criticized Weber's method of understanding for being founded on a quasi-objective meaning structure. Schutz proposed on the other hand an approach which first has to explain the possibility of intersubjective understanding and second the existence of a general scheme of orientation and interpretation in a specific culture, for actors as well as contemporaries and researchers. The Cartesian Dilemma thus became his main problem.

Schutz developed two different approaches for the explanation of the possibility of intersubjective understanding. Schutz gave his first solution 1932 in *The Phenomenology of the Social World*. He used a phenomenologically mundane reduction to find the answer in a close "*we-relationship*". Although this attempt was not a failure, it was also not a clear success. In his later papers Alfred Schutz solved this problem in a more pragmatic way, by assuming that the actors undergo most of their subjective experiences in *social situations* that are more or less similar for all the actors. Behind *both approaches* stands the idea that actors follow a strategy in interactions to refer to similar subjective experiences. Every actor uses only meaningful acts and signs that are, to put it another way, typical for a specific social situation. Each actor deals pragmatically with different subjective experiences. They assume that their alter ego would interpret the situation in a similar way. And in most cases, it is not important for the ego to understand the alter ego's act or speech-act in all the detail based on their individual biographies. Actors can understand each other, because they refer to the corresponding sectors of their biographies. The difference of the abovementioned two approaches lies therefore in the "empirical foundation" of these shared sectors of the actors' biographies (Grathoff 1977: 66f.). Schutz (1932: 184) identified the source of the shared actors' experiences in the *first approach* in the primary experience of a "*we-relationship*" by using a phenomenologically mundane reduction (Grathoff 1989b: 69; cf. Grathoff 1977: 67). The "we-relationship" is in the terminology of Alfred Schutz a relationship in which both actors are mutually aware of each other (Schutz/Luckmann 1979: 91). The fact that the actors' attention is directed to the alter ego in such a close relationship produces short moments in which the ego can empathize with the alter ego. In these moments the stream of consciousness of ego and alter ego runs simultaneously – "we grow older together" (Schutz/Luckmann 1979: 91; cf. Zaner 1961: 82; Natanson 1962: xxxiif.; Grinnell 1983: 185). Because of this characteristic nearness of the experiences in a specific time and space (»*Erlebnisnähe*«) a subjective experience in general (»*Erfahrung*«) can be shared with others (Schutz 1932: 183f. and 196). Intersubjectivity refers therefore in Schutz's first approach to a prephenomenal level of experience, because it occurs in the actual present and lacks conceptualizations (Grinnell 1983: 191). Based on these shared experiences in the "we-

relationship", it is possible to construct types of actors, actions and situations (cf. Schutz 1932: 205; Schutz/Luckmann 1979: 98f.). These types can be applied dependent on the level of anonymity of the relevant actors, actions or situations in different degrees of abstractness as a scheme of interpretation (Schutz 1932: 222; Grathoff 1977: 73). Ideal-types are not static. They adjust to the new experiences the actor has (Schutz 1944: 507; Schutz/Luckmann 1979: 30 and 34). However, although I think that Schutz was able to show that an intersubjective understanding in a very close "we-relationship" is possible, I am not convinced that a general scheme of orientation and interpretation can be constructed out of experiences undergone only in "we-relationships". A prerequisite would be that all meaningful acts have to be experienced in non-anonymous "we-relationships" to become meaningful. But this is actually not the case. The typical behavior of a "police officer" can be understood without knowing any police officers personally. It seems to me that Schutz himself was not satisfied by this explanation, because in his later papers he chose an alternative approach.

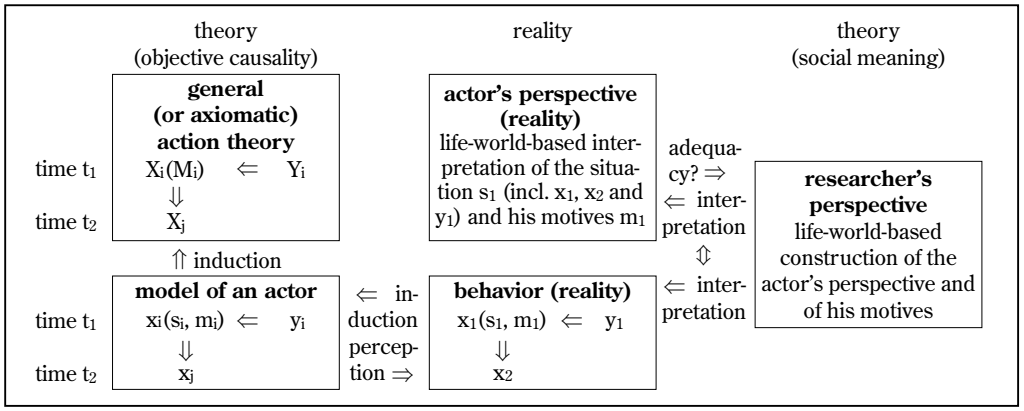
Schutz's *second approach* explains the possibility of an intersubjective understanding in a pragmatic way. The starting point is no longer the specific nearness of a "we-relationship" but the fact that most subjective experiences were undergone in social situations. If these social situations follow a specific pattern, then it is to be expected that the actors had the same typical experiences in similar situations. The existence of intersubjective types is therefore secured because of (Schutz 1953: 7; Zaner 1961: 84ff.; Lachowska 1980: 47):

1) the *social origin of knowledge*: subjective experiences were undergone in typical social situations;
2) *knowledge about the social distribution of knowledge*: I know that a physician typically knows something about medicine, even if I know nothing about it (Schutz 1953: 10f.; Zaner 1961: 86; Berger/Luckmann 1966: 43);
3) the *reciprocity of perspectives* (biographical differences are unimportant): the actors deal pragmatically with subjectively different experiences and their standpoints are exchangeable, because of an assumed congruence of the relevance system (Schutz/Luckmann 1979: 88f.; Lachowska 1980: 48; Luckmann 1992: 35).

The reciprocity of perspectives is unproblematic in the second approach in contrast to the first approach, because it is not based on an actor's subjective experiences but on a meaning structure of the social situation that has already been given (Lachowska 1980: 47). Actors share a common perspective, not because they have had similar experiences in their life, but because they have had similar experiences in similar social situations. And as long as actors refer to their typical experiences – by acting or by interpreting a behavior in a typical way – they will be able to understand each other. Further, by referring to the typical experiences not only in terms of their interpretations but also their actions, the actors will reconstruct the social situation, which again can be experienced by new members of a society as a typical social situation. If intersubjectivity was created in the first approach on a prephenomenal level of experience, then in the second approach it is recreated on a phenomenal level of experience based on given concepts of the past. However, this does not mean that types once experienced in a social situation cannot be applied flexibly to uncommon situations (the more anonymous the situation the more abstract they are)

or rearranged to change the meaning structure of social situations. Only in the process of socialization in the sense of an "empirical foundation" is a typical pattern needed. Therefore not only is an intersubjective understanding based on subjective experiences possible, but also the existence of a (culturally specific) general scheme of orientation and interpretation can be accepted as given on an abstract level. This shared scheme of orientation and interpretation was called by Schutz the life-world.

Table 4: Schutz's solution for the Kantian Problem and the Cartesian Dilemma



Schutz's concept of ideal-types is ultimately a synthesis of Max Weber's concept and position adopted by Ludwig von Mises, the leading figure of the Austrian school of economics of Schutz's time and one of Schutz's teachers. Weber's concept of ideal-types was based on *experience*, but had no general character, because they were chosen arbitrarily. Ideal-types were for him a scheme of interpretation that only had a *chance* of being adequate. Mises, on the other hand, assumed some axiomatically defined sentences of a general action theory to be valid *a priori*, which defined causal *laws*. Schutz's ideal-types are, like Weber's, based on experience and are not valid a priori, but they also have a general character. However, again, they cannot be considered as laws, because there is only a chance that these ideal-types were constructed adequately. But this chance does not depend on probability alone, if the construction of the ideal-types is guided by the life-world of the actors. In this case, the scheme of interpretation of the contemporary or the researcher matches adequately to the scheme of orientation of the actor (Srubar 1994: 262ff.). Instead of Weber's arbitrarily chosen ideal-types as the definitive reason, Schutz proposed life-world-dependent ideal-types as an alternative. Instead of Weber's type-relativism, Schutz demanded type-adequacy (Srubar 1994: 272). Schutz's solution to the Kantian Problem and the Cartesian Dilemma is described in Table 4. The important point is the introduction of a feedback mechanism from the actor's to the researcher's perspective to exclude inadequate schemes of interpretation. With this additional criterion, a falsification of causal theories again becomes possible.[2]

5. Combined solution

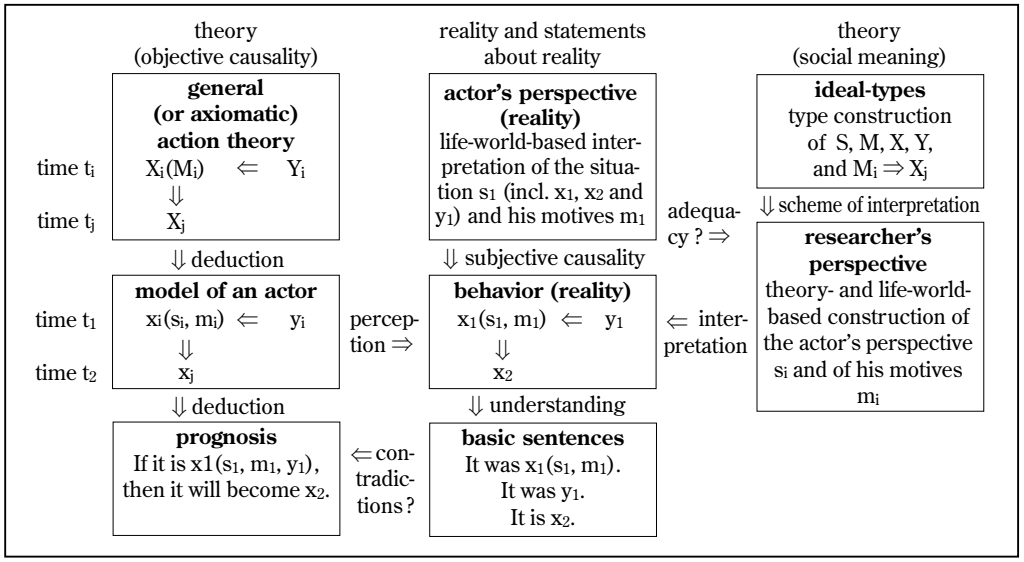
In my opinion, the Kantian Problem and the Cartesian Dilemma can be solved by combining the different methodological ideas of Max Weber, Karl Popper, and Alfred Schutz. Max Weber demanded the use of ideal-types for a causal theory and for a scheme of interpretation to guarantee re-examination of the arguments' internal consistency by other researchers. Although I would prefer to separate ideal-types of a scheme of interpretation from a general theory, I agree with Weber that the internal "contradiction-freeness" is a necessary criterion for solving the Kantian Problem and the Cartesian Dilemma. But this demand of a logical consistency to a causal theory and the consistency of the meaning structure is not a sufficient criterion, because it allows an arbitrary choice of a theory and a scheme of interpretation. Popper can solve this problem with his method of falsification. Theories can be excluded if they do not survive the test against reality. Nevertheless, Popper's neglect of the Cartesian Dilemma produces severe problems. The status of the social sciences is de facto reduced from "empirical" to "metaphysical", which for me is unacceptable. To avoid this conclusion, it is necessary to extend the method of falsification to the interpretations based on a scheme of interpretation. As a result of this extension, causal theories can only be falsified alone if the interpretations were tested without contradictions independently. However, it is not possible to falsify interpretations by questioning the real actors in every case. Schutz offers a solution for these situations. An interpretation can be defined as adequate if it was constructed on the foundation of a shared life-world (the scheme of interpretation shared with the real actors).

Table 5: Principles of the internal and external "contradiction-freeness" in relation to the Kantian Problem and the Cartesian Dilemma

	Kantian Problem (causal theory)	Cartesian Dilemma (scheme of interpretation)
theory-internal "contradiction-freeness"	logical consistency	consistency of the meaning structure
theory-external "contradiction-freeness"	falsification	falsification (by questioning the actors) or adequacy

Table 5 gives a summary of the main principles, and Table 6 describes an appropriate process for a scientific analysis. The Kantian Problem and the Cartesian Dilemma can be solved, but not independently of each other. Even with this combined solution of Weber's, Popper's, and Schutz's methodology it is impossible to find the truth – but at least we can avoid nonsense.

Table 6: Combined solutions of Weber, Popper, and Schutz for the Kantian Problem and the Cartesian Dilemma



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1 I translate here »Sinn« as "sense" and not as "meaning", because only the third point referring to the ideal-types is linked to meaningful behavior. Behavior caused by motivation or by environmental changes is not meaningful, but reasonable.

2 Alfred Schutz never realized that his methodology would be a contribution to the Kantian Problem. His aim was to solve the Cartesian Dilemma, and he was not interested in Popper's problems. It seems to me that Schutz did not even know of Popper's work, because he spoke of a verification (induction) and not of a falsification (deduction) strategy.

Combined Methodology of the Natural and Social Sciences

Christian Etzrodt＊

要約

本論文では，マックス・ヴェーバー，カール・ポッパーおよびアルフレッド・シュッツの方法論を結合することによって，自然科学と社会科学に共通する問題（カント問題）ならびに社会科学に固有の問題（デカルトのディレンマ問題）を解決することが出来ることを示した。マックス・ヴェーバーは科学的説明ならびに科学的結論が理念型に由来する所以を論理的一貫性の公準ならびに意味構造の一貫性の公準の導入にもとめている。これは理論-内部における様々な矛盾の欠点を克服する問題である。ポッパーは，理論は「反証可能」でなければならず，また理論は現実のテストに堪えられなければならないと主張した。これは理論と現実の間の外部的矛盾という欠点を克服する問題である。しかしながら，ポッパーの問題は，もしも用いられる当の「解釈図式」が適切であれば，ある理論は「反証されうる」ということである。アルフレッド・シュッツはこの問題に解決を提供する。彼は解釈図式の間主観的理解の可能性を説明する。解釈図式は，ある（文化的に特殊な）一般的な生活世界に基づいているなら，それは適切に構成されうるのだと。

キーワード：方法論，マックス・ヴェーバー，カール・R・ポッパー，アルフレッド・シュッツ，カント問題，デカルトのディレンマの問題，理念型，反証可能性，適合性

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