Macrosociology, rational choice theory and time: a theoretical perspective on the empirical analysis of social processes

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Macrosociology, Rational Choice Theory and Time

A Theoretical Perspective on the Empirical Analysis of Social Processes

von

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Preface

The B6 project within the Special Collaborative Program on "Status Passages and Risks in the Life Course" examines the time-related interplay between macro-institutional changes (e.g. industrialization, changes in occupational structure, educational expansion, expansion of the welfare state), temporal organization of individual life courses (e.g. age-grading, timing of job shifts and educational attainment) and the formation, continuation and dissolution of households and families. The relationship between macro-level structural change and micro-level individual rational action is therefore at the heart of the project's theoretical interest.

In the first part of this paper, Blossfeld discusses some of the historical reasons why the explosion of rational choice scholarship in the social sciences has had surprisingly little influence on macro-sociological data analysis. In the second part, he shows that any theoretically powerful sociological analysis of a macro-sociological problem must pay attention to both structural- and micro-level issues but not in the usual static way. Any macro-micro framework must recognize that time is significant in this relationship. It must identify the particular historical structures and processes that dominate the changes occurring in a given population, and it must specify the causal mechanisms that allow us to trace the encounters of intentionally acting individuals with the flow of history as a series of choice processes. Applying the project's research to consensual unions, he demonstrates his general theoretical arguments by giving concrete examples.

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Table of Contents

1. Introduction

Since the early 1980s, there has been an explosion of articles and books about the need for rational choice approaches in sociology.[1] As a consequence of this, rational choice theories[2] have rapidly grown in complexity and sophistication. Although these approaches primarily aim to improve our understanding of real world phenomena, it is surprising how little impact they have had on empirical social research in general (see, e.g. Green and Shapiro 1994) and on large-scale data analysis in particular (Goldthorpe in this volume).

In this paper, I first want to discuss some of the reasons for this development in the field of quantitative macrosociological analysis. My thesis is that the ambitious endeavor of rational choice proponents to establish a "new"[3] theoretical paradigm in sociology has led to the creation of camps and fairly artificial antagonisms between a rational choice perspective and all the other types sociological approaches.

Since rational choice theory is fairly established in sociology today, the time may be ripe for more relaxed considerations which could help to overcome an unproductive dualism between macro-level and micro-level approaches in the field of large-scale data analysis.[4] The objective of this paper is to achieve some progress in this respect. I contend that only few successful empirical studies of a macrosociological problem can concentrate on structural or micro approaches alone. Instead, a theoretically powerful sociological analysis must pay attention to both structural- and micro-level

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[1] To mention only some of many important publications: Coleman (1986, 1990), Coleman and Fararo (1992), Elster (1979, 1986, 1989a, 1989b, 1989c), Esser (1990, 1991, 1993), Esser and Troitzsch (1991), Friedman and Hechter (1988), Gambetta (1987), Heath (1976), Hechter (1983, 1987), Hedström and Swedberg (1995), Kiser and Hechter (1991), Lindenberg (1982, 1985, 1989, 1990), Opp (1986), Raub and Voss (1981), Voss (1985), Wippler and Lindenberg (1987).

[2] I use the term rational choice theory loosely to include rational action theory (e.g. Abell 1992), utilitarian or economic conceptions of man (e.g. Lindenberg 1985), as well as strategic or game-theoretic modes of thinking (e.g. Elster 1979).

[3] Actually, the lines of thought can be traced back to classical authors in economics and sociology.

[4] For the need to link macro- and micro-perspectives, see Stinchcombe (1968), Sørensen (1977), Hechter (1983), Tilly (1984), Granovetter (1985), Coleman (1986), Friedman and Hechter (1988), Esser (1991), Oppenheimer (1994), Blau (1994), Hedström (forthcoming), Hedström and Swedberg (in this volume), or Goldthorpe (in this volume).

issues. However, this macro-micro framework[5] must recognize from the outset that time matters in this relationship. It must achieve two goals: (1) it must identify the particular historical structures and processes which dominate the changes occurring in a given population, i.e., the sociologically important dependent and independent variables;[6] and (2) it has to specify the causal mechanisms that allow us to trace the encounters of intentionally acting individuals with the flow of history as a series of choice processes.

The invaluable function of time in this respect is to offer a continuously changing point of reference by distinguishing, conceptionally and empirically, between a closed (but always changing) past, the respective presentness, and an intrinsically open future. Good sociological theories should not only allow us to explain (or understand) a given outcome at present with reference to the closed past, but also help us to predict outcomes in an uncertain future with reference to the known past and present conditions. In my view, the crucial empirical test of sociological theories is not the extent to which they help us to explain a given outcome ex post facto, but the degree to which they also yield successful predictions of individuals' actions and their outcomes ex ante.[7]

Over the last 15 years, modern longitudinal social research has made great progress in assessing causal inferences based on sociological theories more adequately.[8] Life course and panel studies have collected time-related data over substantial blocks of space and historical time. In methodological terms, the most important but still fairly unrecognized advancement that has been made is that longitudinal data can be studied by new statistical methods in a stepwise time-related fashion. They allow us to follow up a great number of individuals belonging to different cohorts over longer spans of time and to differentiate at each point in time between a closed past, the presentness, and an intrinsically open future (Blossfeld and Rohwer 1995). My intention in this paper is to demonstrate how causal relations suggested by a dynamic combination of macro and micro theories can be represented in event history models and tested with temporal data.

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[5] As I will discuss below, I agree with Blau (1994) that Coleman's (1990) micro-macro transition needs to be reversed into a macro-micro transition.

[6] Rather than assume abstractly specified processes such as differentiation, individualization, or concentration (see Tilly 1984).

[7] With regard to theory, Elster (1989a) distinguishes determinacy and adequacy. A theory is indeterminate when and to the extent that it fails to yield unique predictions. It is inadequate when its predictions fail.

[8] In these studies the point of reference that distinguishes a posteriori and a priori is not the survey date anymore, but may be any point in time within an observation window covered by a longitudinal study (Blossfeld and Rohwer 1995).

2. Why Has Rational Choice Theory Not Been Very Successful in Large-Scale Data Analysis?

Let me first consider the reasons for the obvious fact that the influence of rational choice theory on quantitative macrosociology has been surprisingly small (see also Goldthorpe in this volume). My thesis is that in the process of establishing rational choice theory as a "new" theoretical paradigm in sociology, its proponents have tended to pigeonhole their rivals, to caricature competing theories, to exaggerate existing theoretical cleavages, to overlook their own conceptional weaknesses, to downplay the difficulties of their empirical applications, and to neglect more recent and actually quite successful theoretically driven research programs based on longitudinal data.[9]

Of course, there is not only one single rational choice theory but perhaps as many different versions as there are protagonists.[10] There has also been an important shift from earlier crude models with fairly unrealistic behavioral assumptions towards more recent theories elaborating the role of heterogeneous preferences, the effects of uncertainty, the impact of structural constraints, the relationship between norms and rational choice, and the possibilities of the non-existence of a rational choice. No doubt, this development has made rational choice approaches increasingly attractive for empirical practitioners. However, the result of the aspiration to establish rational choice theory as the only coherent and unified theoretical approach in sociology has been the creation of a scientific camp mentality which unfortunately almost completely disregards rational choice approaches in large-scale data analysis. Using a concrete example of my recent research on consensual unions, I want to demonstrate this in more detail here.

Attacking Outdated and Empirically Unimportant Theories

Rational choice theorists have frequently been polemical against specific sociological conceptions which rarely had but certainly almost completely lost their influence on empirical studies today. For example, proponents of rational choice theory enjoy criticizing the homo sociologicus[11], extreme normative sociological conceptions[12],

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[9] The most important examples are life course, cohort and panel research.

[10] After reviewing the rational choice literature for this paper, I was increasingly confused by the great number of obviously contradicting propositions, theoretical statements and hypotheses discussed in this field. The only common denominator seems to be a commitment to purposive individualism: an epistemological position that social phenomena can only be explained in terms of intentional actions of individuals. But even this position is not shared by all rational choice theorists. Some of them do not use individuals as the unit of analysis but treat states or firms as corporate actors (see the discussion in Friedman and Hechter 1988).

[11] For example, the critique of Lindenberg (1985, 1990) or Esser (1987, 1989, 1990, 1991) with regard to the conception of a socially determined homo sociologicus is

crude functionalism, or more elaborated models of structural-functionalism[13]. But as far as I can see, all of these theories, though still discussed in theoretical sociological seminars, have turned out to be fairly irrelevant in contemporary empirical research.[14] Thus, even if the theoretical critique of rational choice proponents is justified, it could not be very consequential for the conduct of concrete empirical social research today.

I want to demonstrate this point with a concrete example from my recent research where my colleagues and I analysed the question of why people living in consensual unions marry if there is a pregnancy (Blossfeld, Klijzing, Pohl and Rohwer 1995). In an extreme version of the normative model, one would have to assert the dominance of normative constraints and simply deny the importance of a choice at all. Thus, with the occurrence of a pregnancy in a consensual union, norms would have the effect of cutting down the feasible set of actions to a single point, i.e. marriage. Today's cohabitating men and women would therefore be portrayed as mindlessly repeating or imitating what the ancestors did in the past in similar situations (see Elster 1989b). But as a serious theory of marriage action this model is obviously too wrong to merit any empirical analysis. Hence, it is not surprising that, to the best of my knowledge, there is no empirical researcher who has shaped his/her analysis of this problem on the basis of such a strong normative conception.

Rejecting an extreme normative approach in empirical studies however does not mean that norms (and culture) do not matter. Rather it is my view that norms are extremely important. Social interactions are intrinsically symbolic relationships that have a meaning and can therefore not be understood without reference to cultural settings.[15] Yet in their fierce attempt to push for a duality between an intentionally acting person

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justified, but I actually do not know any contemporary empirical researcher who would work with this strong version of the homo sociologicus in his/her empirical study.

[12] For example, Elster (1989b) rightly declines the extreme version of the normative model because people would then simply stick to prescribed behavior even if new and apparently better options become available. But I do not see that such a caricature of man as a pure passive executor of inherited norms would be the theoretical basis of any empirical analysis today.

[13] For example, Coleman (1986, 1990), Elster (1979) or Hechter (1987) convincingly reject functional and structural-functional explanations because these theories have no place for individuals, and purpose (or any regulative idea) must be rejected at the system level. But which serious empirical researcher of social phenomena would still employ such theories of the 1960s and early 1970s?

[14] Of course, this observation reflects the huge gap between theory and empirical research in today's sociology.

[15] For example, Ferejohn (1991) suggested that rational choice approaches have to be complemented by cultural theories to be more successful.

guided by instrumental rationality and a passive executor of social norms (or culture), rational choice theorists often lose sight of the fact that norms (culture) and rational choices are important in empirical applications.[16] The important theoretical issue for empirical analyses is therefore not whether social norms (culture) or instrumental rationality provide the motivation for actions[17], but how they can be conceptionally integrated so that we are better able to understand real life situations.[18]

For example, in the research application mentioned above, values, social norms, and traditions certainly have an important impact upon people's marriage behavior in the case of a pregnancy, but in most cases this influence is likely to be mediated through the intentional actions of individuals. It is therefore plausible that there is a changing, frequency-dependent[19] coexistence of norm-guided behavior and rational, self-centered behavior with regard to the decision to marry when a pregnancy occurs in a consensual union (cf. Elster 1989b). In such a hybrid model of empirical application, social norms do not dictate the marriage behavior, but allow a deliberate, reflective imitation of traditions. This is because social norms normally offer a considerable scope of interpretation and manipulation. Social norms' main function might be to focus and coordinate expectations (Elster 1989b). Thus, when the norm "If the woman gets pregnant, then marry" is still shared within a community, people will to a certain degree expect each other to do that. In particular Elster (1989b) has stressed that the coordinating function of norms is mainly due to the strong emotions that their violations can trigger in the violator himself and also in other people. Thus, the social norm "If the woman gets pregnant, then marry" is likely to be sustained by the feelings of embarrassment, anxiety, guilt and shame that a person suffers at the prospect of violating it. Of course, such emotions may or may not help unmarried couples to reach a marriage decision when the woman is pregnant, and they certainly will rarely be the only motivation for such an important and long-term decision. But this concrete research example illustrates that our understanding of the relationship between norms and intentional action is only in its rudimentary beginnings and that rational choice theory simply must provide better analytical concepts in this regard, if it is to serve as a powerful instrument in empirical applications.

Aspirations to Universal ("Time-Less") Theories

Many (but fortunately not all) rational choice theorists adopt a rigid version of the modern philosophy of science (Green and Shapiro 1994). They strive for general

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[16] See, for example, Opp (1986) who comes to a similar conclusion in his empirical application.

[17] "Norms do not usefully contrast with self-interest." (Lukes 1991:148).

[18] See, for example, the interesting papers by Lindenberg (1983), Heiner (1983), and Lukes (1991).

[19] The probability that people will follow a social norm at time t' is very likely to be dependent on the degree of conformity in a social context at time t ($t < t'$).

causal theories and universal laws (e.g. Lindenberg 1985; Esser 1993) and think little about "historicistic analyses" and "inductive generalizations" (e.g. Kiser and Hechter 1991). Regardless of how one values the merits of historicism and induction in sociology[20], by no (logical) means are sociologists forced to accept only a choice between statements about universal laws or statements about accidental, contingent historical relationships. Rather, sociologists can legitimately try to establish causal mechanisms of limited generality tailored to a specific range of historical situations (e.g. Gambetta 1987; Elster 1989c; Hedström and Swedberg 1995 and in this volume). I will develop this perspective in more detail in the next section.

Yet the strong aspiration to develop general theories and universal laws of social action may be one of the reasons why many sociologists consider rational choice theory to be empirically unappealing. In particular, the mainstream version of this approach "explains" people's rational actions with regard to universal and stable general human preferences and considers constraints as exogeneously given (Stigler and Becker 1977; Becker 1981; Lindenberg 1985, 1990). However, if preferences are universal and stable among individuals (Stigler and Becker 1977; Becker 1981; Lindenberg 1985, 1990), they must turn out to be simply irrelevant for explaining differences in peoples' behavior (Gambetta 1987).[21] In this model, individuals' particular "tastes" or their marginal utilities, for specific courses of actions can therefore only be derived from the constraints (or opportunities) in concrete social situations. Thus, economically rational individuals may be portrayed as passive agents, with no more outstanding intentions than to adjust optimally to changing constraints.[22] However, without specifying the concrete constraints and their changes in time and space, the theoretical model is necessarily empty (Kelle and Lüdemann 1995). The trick is to distill into an explanation the important constellation of factors in a situation and their relations. The question is not whether to abstract from the complexity of the social reality (see e.g. Lindenberg 1985) but whether the appropriate abstraction has been done. Thus, "if an abstract theory has explanatory power, this is not merely because it is abstract, but because the abstraction in question captures the essence of what is going on causally" (Green and Shapiro 1994:191).

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[20] As noted by Oppenheimer (1994), good sociological research is normally characterized by constantly going back and forth between theoretical and empirical analyses (between deduction and induction).

[21] For example, Lindenberg (1985, 1986, 1990) further developed Becker's theory to what he calls a "social production function approach", assuming that there are at least two ultimate human goals: "physical well-being" and "social approval." As a third candidate, he also mentioned "loss-avoidance." However, whether one accepts Lindenberg's assumptions about these ultimate goals of man or not is actually not important because they do not explain differences in individuals' actions.

[22] Ironically, against the critique of rational choice theorists that the homo sociologicus is conceptionalized only as a puppet of structure, one could reply that the homo economicus is only a puppet of structural change.

This leads us to the next question: What are the important constraints and possible alternative courses of actions?[23] Because these issues are exogenous to rational choice theory, this model must be silent in answering this question. Thus, rational choice theory logically presupposes macrotheory to identify the specific historical structures and processes which produce and change concrete opportunity sets for individuals' actions and, one should add, cut down the set of abstractly possible courses of action to a vastly smaller subset of feasible actions (Elster 1979) - making choices possible at all[24] (see Blau 1994). Blau is therefore right that Coleman's micro-macro transition needs to be reversed into a macro-micro transition to represent the correct causal nexus (Blau 1994:150).[25] To avoid ad hoc formulated "bridge assumptions" (Lindenberg 1990)[26] about concrete action situations, rational choice theory needs an explicit macrotheory.[27]

Let me demonstrate this point again using the above application example. The economic theory of the family (see Becker 1981) postulates that the general preference to marry is basically the same for all actors at all times and places, so that differences in observed marriage behavior after the occurrence of a pregnancy can only be explained by differences in the set of opportunities. But what are the concrete opportunities in this specific action situation? Using Becker's economic theory of the family, we simply don't know! This universal theory only states that the decision whether to marry at all when a pregnancy occurs is related to expectations of what will happen within marriage in the future: (1) what the expected gains are (i.e. the dependencies of partners' utilities on each other[28]) and (2) how they are going to be

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[23] In Lindenberg's (1985) terminology: What are the initial conditions?

[24] There is no choice without alternatives. In the rational choice theory, constraints are assumed to be not within the control of the agents. However, human actors always have the choice to change these alternatives. This causes Gambetta (1987) to argue that rational choice theory is more likely to ask which course of action an individual is likely to choose among those open to him, rather than how and when individuals will take action for changing the available alternatives.

[25] Of course, this controversy between Blau and Coleman only reflects a very static view of the world. As I will develop below, both perspectives are important simultaneously.

[26] In the case of empirical social research, it would be better to use the term "bridge hypotheses" instead of "bridge assumptions."

[27] This is because these assumptions cannot be deduced from the general rational choice model.

[28] In the economic theory of the family, altruism is particularly considered to be an important element in the functioning of families. It ties couples together even if only one of the partners is altruistic. They then all care about their joint income, and all try to maximize it, even the selfish family members. The mechanism that guarantees this is the compensatory behavior of transfers from altruists to others.

distributed (e.g. to which degree positive assortative mating is associated with complementarity[29]), and (3) what division of labor they rest on (e.g. the extent of sex-specific specialization in the household and market sector). Because real actors are normally not asked to give answers to these questions, it is easy to see that without additional (ad hoc) hypotheses about the various concrete gains of marriage, their actually possible distribution among the partners and the history-specific types of division of labor between the sexes, this "explanation" is necessarily empty in any empirical analysis. Thus, concrete history-specific hypotheses about the constellation of constraints (opportunities) are needed in any empirical application. Because rational choice theory does not generate them, the researcher is dependent on his/her ingenuity. Of course, this opens the door for ad hoc considerations.

In our concrete research example, the researcher therefore would have to "speculate" about the reasons for marriage today. For instance, he/she could contend that marriage provides the opportunity for long-run intimacy and emotional support, a companionship that, by involving historical continuity, promises memories of a shared past (Oppenheimer 1988). It also provides the opportunity for regular (and safer) sex, and so on. Most of these returns to marriage not only defy easy quantification, but, more important for our current example, these gains could also be obtained within long-term consensual unions.[30] Why is it then that many of these couples want marriage as a setting for having children? In economic terms, one could argue that in (West) Germany the tax system rewards non-work or part-time work of one parent and since not enough kindergartens, pre-primary schools and daycare institutions are provided in (West) Germany, one of the parents (the wife in particular) tends to interrupt her/his employment when the child is born, and to a large extent, only re-enters the labor market again after some lengthy period, if at all.[31] Thus, the concrete (economic) returns to marriage for such couples would be tax reduction and more security for the parent (the wife in particular) that leaves the labor market for some period. Another reason for men could be that in (West) Germany custody for the child

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Thus, as long as the altruists receive something, selfish family members behave altruistically both toward altruists and toward the altruists' other beneficiaries. This type of behavior makes it possible to define a family utility function based on the altruists' preferences, which everybody wants to maximize.

[29] This means to which degree there is a beneficial effect of one trait on the marginal contribution of the other.

[30] It is important to note here that most of the gains of marriage assumed by the economic theory of the family can also be realized in consensual unions of modern societies. In this sense, the economic theory of the family circumscribes a very traditional family system.

[31] Theoretically, husband or wife could interrupt their employment, but empirically it is still an exception that husbands stay at home (see Blossfeld, Drobnič and Rohwer 1995).

is only granted to the married father. However, if the partners get along very well with each other this could be of minor importance.

In summary, this example demonstrates three interesting points: (1) All of these reasons are somehow plausible motivations to get married; (2) they are not specifically suggested by rational choice theory; and (3), at least in my view, they are unlikely to be the reason for such an important and long-term life course decision as marriage.[32] Thus, rational choice protagonists' endeavor for universal theories comes at a high price: theorizing does not arise out of concrete empirical problems anymore and the suggested more specific hypotheses often become more or less arbitrary. However, it is exactly these specific hypotheses that are of particular interest in any empirical study. They help the researcher to understand the situation or to predict individuals' concrete actions, and they are the "variables" that typically have to be assessed through empirical research.

Criticizing Empiricist Studies

When rational choice proponents survey large-scale data studies, they normally focus on a very specific type of empirical research that is predominantly non-theoretical, methods-driven or simply empiricistic. For example, Esser (in this volume) attacks quantitative social research from the perspective that it only tries to "explain" the variance of a dependent variable by a set of independent variables.[33] True, there are many practitioners of quantitative sociology who are uncritically happy when associations are found, and the stronger the better.[34] However, there are just as many competent empirical social scientists who know that this narrow view is wrong and unproductive (see Goldthorpe and Ultee in this volume). They are aware of the fact that variance explained or high levels of goodness-of-fit statistics do not explain anything, only theory does.[35] However, in their attacks against non-theoretical and merely methods-driven kinds of empirical research, many rational choice protagonists tend to throw out the baby with the bathwater and disregard the great number of

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[32] For example, in Sweden, a country with a tax system that does not reward dual full-time marriages and offers better child-care provisions, it is still very common for cohabiting couples to marry in the advent of a first birth (see Hoem 1995:46).

[33] See also Coleman (1986) and Freedman (1991).

[34] See the excellent book by Lieberson (1985).

[35] Ironically, the introduction of newer approaches to data analysis - log-linear models, logit models, hazard rate models - decreased the danger that applicants will be mechanical with respect to "explained variance" because maximum likelihood estimation does not provide such a nice measure like R^2. Pseudo-R^2 measures are much less attractive because they depend on the number of observations and successive comparisons with likelihood ratio tests can only be relative (and in most cases hierarchical).

excellent and theoretically informed quantitative work, particularly in the newly developing field of longitudinal data analysis.

Caricaturing Social Stratification and Mobility Researchers to be Studying Variables Instead of Actors

Many proponents of rational choice theory have blamed social stratification and mobility researchers to be "variable sociologists"[36] (e.g. Esser in this volume) studying the relationships between variables instead of actors (e.g. Elster 1979; Coleman 1986; Boudon 1981; Abbott 1992). Technically speaking this is indeed true. Using the individual as the unit of analysis,[37] stratification researchers ask people about their characteristics, things they do, or things that have happened to them. These measurements are stored as variables and the relationship among them is then analyzed using statistical techniques. However, to contend that structural researchers conceptionally treat "variables rather than individuals as the units of analysis" (Boudon 1981; Esser in this volume) or even "variables as subjects that are doing the action" (e.g. Abbott 1992) is more than a caricature of a competing sociological approach. It also exaggerates (small) existing theoretical cleavages between structural approaches and the mainstream version of rational choice theory.

True, structural researchers theoretically focus on the constraints of individual actions rather than on individuals' intentions. They are particularly interested in situations where the actions of a great number of individuals are channeled by external constraints leaving not much room for the importance of individual choice. For example, mobility processes between social classes (e.g. Erikson and Goldthorpe 1992), educational opportunities of working class children (e.g. Shavit and Blossfeld 1993), mobility constraints for workers in various labor market segments (e.g., Blossfeld and Mayer 1988), wage differentials between men and women (e.g. Hannan, Schömann and Blossfeld 1990), gender-specific career opportunities (e.g. Blossfeld and Hakim forthcoming), structural constraints in the process of family formation (e.g. Blossfeld 1995) etc. In most such empirical applications structural sociologists do not deny choice. Rather they contend that structural constraints affect individual actions by determining the objective probabilities that their most preferred aim (e.g. better educational attainment, higher income, career advancement, better life etc.) can be realized. Thus, structural constraints make some desired aims easy for individuals to attain; they make other goals more difficult to attain and, in extreme cases, they preclude the attainment of specific ends altogether (Friedman and Hechter 1988). For example, the role of consensual unions was quite different in the former Federal Republic of Germany (FRG) and the German Democratic Republic (GDR) (see Blossfeld/Klijzing/Pohl/Rohwer 1995) because of different structural constraints. In the

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[36] In German the term is "Variablensoziologen" (see Esser in this volume).

[37] We neglect inequality studies based only on aggregated data because they are rarely used today. Most social structural and mobility studies are based on individual data.

GDR after the late 1970s there was a structural reason not to marry in the event of a child because these unmarried mothers had privileged access to daycare institutions, had longer paid maternity leaves, and had a better opportunity to stay at home and take care of sick children (Huinink 1994). Therefore, in the GDR more than 50% of first births took place out of wedlock in the late 1980s, whereas in the FRG, the respective figure was still below 10% at the end of the 1980s (Pohl et al. 1992). In addition, mothers who were enrolled in school received better daycare service for their children and privileged access to student's homes etc. And this explains why there is no significant effect of educational attainment and school enrollment on entry into marriage and motherhood for East Germany. In the GDR, a pregnancy was no danger for the school career, as has been the case for West Germany.

It is also true that in structural studies the assumptions about actors are often left implicit (Gambetta 1987). However, because structural sociologists normally accept, implicitly or explicitly, the rationality assumption ("people act reasonable") as well as the presumption that individuals strive for similar ends (e.g. better educational attainment, higher income, career advancement, better life etc.), they simply consider the intervening action orientation of individuals as fairly uninteresting compared to the impact of structural constraints. Thus, one could contend that their explanations only seem to be "incomplete" (e.g., as contended by Esser in this volume) because it would make little difference for our understanding of individuals' actions, if a structural explanation of possible courses of action were explicitly added to a highly sophisticated choice model or not.

To some extent, this discussion also shows that the distinction between an economist's (e.g. Stigler and Becker 1977)[38] explanation[39] on the one hand and the explanation of a structural sociologist on the other becomes obscure. In both approaches changing constraints are extremely important. However, in my view, the approach of the structural sociologist is theoretically superior because it does not consider the changes in the constraints as theoretically external or assumed to be given. Rather it tries to identify and conceptualize the relevant structural alternatives in an evolving social world.

Problems of Predicting Courses of Action

As summarized by Elster (1989a), rational choice theory conceives the actor as a decision-maker who successfully achieves three optimizing operations: "finding the best action, for given beliefs and desires; forming the best-grounded belief, for given evidence; and collecting the right amount of evidence, for given desires and prior beliefs" (Elster 1989a:4).

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[38] But also adopted by sociologists (see e.g. Lindenberg 1985).

[39] Assuming that only opportunity costs differ, so that "new tastes" could be derived from the change of specific constraints, given general human preferences.

Early rational choice models have not been very attractive for practitioners of empirical research because they suppressed most real-world complexities of the decision situation by unrealistic behavioral assumptions (see Goldthorpe and Ultee in this volume). In order to derive "elegant" models, scientists assumed that preferences and constraints are given and that the actors are fully informed about all possible courses of actions, and about their consequences as well as the likelihood of events. It can be shown that all sorts of behavior are consistent with or plausibly suggested by these types of choice models. However, not surprisingly, they have not been very successful in predicting peoples' behavior empirically.

Predictions of empirical courses of action might fail in such rational choice models because of two reasons: (1) people may act irrational and/or (2) the real-world situations in which people try to behave rationally are much more complex than assumed in the theoretical model.

Let me first discuss the case where people behave irrationally. In this case, individuals do not carry out the action that is best for their given beliefs and desires; they do not form the best-grounded beliefs for given evidence or do not collect the right amount of evidence for given desires and prior beliefs. Although irrationality is quite widespread, I will not discuss it any further here. The reason is that we are not interested in determining the actions of particular individuals but in explaining the general regularities which govern the actions of many people (see Goldthorpe in this volume). At this aggregated level however the rationality assumption plays a privileged role -- not only because most people normally want to be rational, but also because the prediction of the behavior of aggregates will most likely be successful if we assume that, by and large, people act rationally (Elster 1989a).[40] As Stinchcome (1968) has shown, the behavior of large aggregates can also be comprehended reasonably well, even when the individual components of the aggregates are poorly understood. Given this macro-level focus, small idiosyncratic deviations of individuals from the postulated rational model are not damaging for sociological predictions (Hedström forthcoming).[41] Aggregate intentions are also apt to be much more stable than individual intentions over time (Ajzen 1985). See, for example, the studies about the number of children women planned to have (Bumpass and Westoff 1969;; Westoff and Ryder 1977). They showed that at the individual level only 41% of the women had exactly the number of children they had planned. On the average, however, the women's actual family size (3.3 children) was found to correspond precisely to the intended family size (also 3.3 children) (Bumpass and Westoff 1969).

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[40] And even if we conclude that irrationality offers the best explanation of a given kind of group behavior, then most of the evidence about the agents that goes into that conclusion is formed on the assumption that they are, by and large, rational (Elster 1989a).

[41] Thus, rational choice explanations need not be derivable from postulates about psychological states of individuals. However, they must be compatible with optimizing assumptions about the intentions of individuals (Green and Shapiro 1994).

For empirical applications in sociology, it is more interesting to discuss prediction failures of rational choice theory because real-life situations are much less determinate than assumed in the restrictive theoretical models. Following Elster (1989a), such uncertainties can arise at three levels.

First, the actions of individuals may not be easily predictable because individuals are unable to compare and rank all possible courses of action. This problem is particularly severe when individuals know little about the alternatives themselves to make a rational decision. For example, it is hard for people to compare and rank rationally different future educational tracks, alternative job careers, differences in long-term marriages with various partners etc. because they simply do not know much about these alternatives in future. Thus, when decisions have to be made to prefer one future mode of life to another, more peripheral considerations often come to the fore to motivate a decision (Elster 1989a). In this sense, one could argue in our particular research example that couples living in consensual unions do know little about their concrete marital lives in future (Burkart 1994) so that they have to motivate their marriage decisions by more "peripheral reasons" like tax reduction and more security for the wife that leaves the labor market for some period. But there is not only the question of whether to marry. Equally important is an answer to the question of when the right time for marriage is. If future possible alternatives (with other marriage partners) are not yet known, there is also the problem of when to make the optimal decision with regard to these (still unknown) alternatives. There is always an incentive to postpone a marriage decision because other possible marriage partners might be more attractive, but postponing marriage forever clearly might not be optimal for an individual who would like to marry. On the other hand, there is also the danger that the current possible marriage partnre opts for another partner making it attractive to marry earlier. Thus, in many situations people have to introduce a mechanism that triggers off a decision at a specific point in time. For example, couples ready for marriage could decide not to use contraceptives anymore and simply wait to see what happens. The "chance event" of a pregnancy could then be used as a motivation to determine the concrete timing of entry into marriage.

Second, the behavior of actors may be hard to predict, as there could be uncertainties with regard to their beliefs. This means that individuals are not able to reliably assign probabilities of possible results of their future courses of action. With respect to the previously mentioned research example, men and women living in consensual unions will have problems in predicting the future gains of marriage, how they will be distributed amongst them and what division of labor they will rest on. Under such uncertainties, rational choice theory is quite limited. As noted by Elster (1989a), this problem is particularly severe when a decision requires beliefs about choices to be made by other people in future, as is the case in our research example where each prospective marriage partner must have long-term beliefs about the future choices to be made by the respective other one.

Finally, problems arise with regard to the optimal amount of information one should collect before forming an opinion. Collecting information is necessary, but costly and time- consuming. Unfortunately, it is often not possible to estimate probable marginal costs and benefits for further information searches. Therefore, actors sometimes set

certain tolerance limits for themselves which, when satisfied, stop the search for additional information (Simon 1954, Esser 1991). Thus, in our example, cohabitation could be interpreted as a temporary trial period before marriage (Manting 1994). The problem of each partner is to then decide how long he/she should further collect information about the respective other person in daily life situations until a reasonable marriage decision can be made.[42] Also in this case, the event of a pregnancy can help the couples to stop further information searches about each other and push them to make up their minds.

In summary, in many empirical applications of large-scale data analysis rational choice theory can be attacked as a quite powerless theory when one wants to derive unambiguous predictions because of the absence of well-defined sets of alternatives and their consequences, information processing limitations in computing optima from known preference and utility information or unreliable probability informations. Thus, in my view, the usefulness of rational choice theory for typical empirical applications in macro sociology is crucially dependent on the extent to which this approach is able to incorporate various forms of unresolved value conflicts and the consequences of uncertainty.

Heiner (1983), for example, argues that the limits to maximizing actually become the origin of predictable behavior. He suggests that the observed regularities of actions should be understood as "behavioral rules" that arise because of uncertainty in distinguishing preferred from less-preferred behavior. Uncertainty requires actions to be governed by mechanisms that restrict the flexibility to choose potential courses of actions, or which produce a selective alertness to information that might prompt particular courses of actions to be chosen. These mechanisms will simplify behavior to less-complex patterns, which are easier to recognize and to predict (by the actors themselves and, of course, by the social scientist!). According to Heiner (1983), predictable behavior will evolve to the extent that uncertainty prevents agents from successfully maximizing. Greater uncertainty will cause behavioral rules to be more restrictive in eliminating particular actions or response patterns to potential information. Heiner (1983) interprets social institutions or social norms as such rule-mechanisms for dealing with recurrent situations faced by individuals (see also Lindenberg 1983; Esser 1991; Lukes 1991).[43] They enable each actor (and the social researcher!) in modern societies to know less and less about the behavior of the other individuals and about the complex interdependence generated by their interaction.

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[42] Interestingly, many empirical studies on the role of cohabitation in the divorce process show that people who have cohabited before marriage have much lower marital stability than couples who did not cohabit before marriage (Hoem and Hoem 1988; Bumpass and Sweet 1989; Schoen 1992; Klijzing 1992; Manting 1994). This suggests a self-selection process, in which couples with a high dissolution rate select themselves into consensual unions before marriage.

[43] See also the work on "habits" and "framing" (e.g. Lindenberg 1990; Esser 1990).

Another way to reduce choice complexity under uncertainty is that individuals attempt to constrain or bind the flexibility of their own future actions (Elster 1979). This line of argument offers a more general explanation for the marriage decision in our research example. It could be developed round the idea that having children is an irreversible, long-term, joint project that constrains the behavior of both partners (and that of the woman in particular). On the one hand, a child decreases the chances of finding a new potential partner for both women and for men. There is a greater need for stability for both partners because later possible matches may not be as desirable as the current one. This risk is probably greater for women, given their tendency to be responsible for children (Oppenheimer 1988; Blossfeld, Manting, and Rohwer 1993). In addition, if quality of children (Becker 1981) is an important desire of individuals, then this dramatically will constrain the future behavior of both partners. A major difficulty of making this joint long-term project a successful one, however, lies in forecasting the own future behavior and the future behavior of the cohabiting partner on the basis of the incomplete information currently available. This suggests that the decision to marry depends partly on how well the individuals can predict their own and their partner's future lives. One rational way of making oneself act in favor of the joint long-term project in future is to induce a belief from which that course of action will follow compellingly (Elster 1979). From this point of view, marriage could be seen as a precommitment to bind oneself at present in order to increase the probability that one will carry out a certain (honorable or responsible) behavior with regard to the child and the partner in the future. As noted by Elster (1979), the crucial point here is that the expected change in the probability of the later course of action is the motive for marriage -- not an unintended effect, nor a predictable and not unwelcome effect. Marriage as a means of precommitment is also a natural technique for lending credibility to promises for the partner (Elster 1979). Thus, it might be individually rational to follow the norm "If the woman gets pregnant, then marry" because it lends credibility to promises that otherwise would be less believable. Hence, an important condition for predictable behavior is making credible communications about what one will do under future circumstances.[44] These credible promises enable the partners to cooperate more than they would have otherwise done. There can be three reasons why unmarried partners are expected to behave more honorably when they are married under unforseen circumstances in the future: (1) Marriage instead of cohabitation is not considered to be a trial period;[45] (2) marriage compared to cohabitation has a

[44] It goes without saying that the partners are free to bind themselves through a marriage contract to protect their "deeper" values against their more impulsive ones (see Elster).

[45] There is plenty of empirical evidence that the period of cohabitation in modern societies is still dominated by a "weeding process" (Klijzing 1992).

much higher level of stability,[46] and (3) the dissolution of a marital contract involves much higher transaction costs than the dissolution of a consensual union.[47]

Neglecting the Dynamics of Historical Processes

Although the framework of rational choice theory is inherently dynamic (Lindenberg 1985),[48] most of its proponents have not really taken the time-relatedness of social processes seriously. Rather they prefer logical reconstructions of "time-less" action situations (see, e.g. Esser 1991). This is because much rational choice scholarship is (very often implicitly) an equilibrium analysis under static conditions (Green and Shapiro 1994; Ultee in this volume).[49] It is simply assumed that such choice situations can be arbitrarily abstracted from a continuous social process, involving two unproblematic sets of factors: preferences and (perceived) action opportunities (Hedström forthcoming).[50] The problem of this "ahistorical approach" is the implicit assumption that subsections of the social process have clear beginnings, middles, and ends.[51] But this does not hold for entities such as societies. For them, as noted by Abbott (1992), there is only an endless middle. Societies consist of a continuous stream of historical events and sets of situational consequences flowing from those events. Thus, when we conduct an empirical study, the historical process is always ongoing and this poses difficult theoretical and empirical specification problems with

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[46] All studies show that marriages have a much higher level of stability (e.g. Klijzing 1992; Hoem 1995).

[47] Based on this analysis, one could offer a speculative argument about the changing significance of marriage as a credible promise: If cohabitation loses its meaning as a trial period, changes its character with increasing stability, or if the costs of divorce are reduced, then this will tend to erode the chances of making a credible promise by the act of marriage and lead to fewer marriages in the case of pregnancies in consensual unions.

[48] For example, Becker's (1975, 1981) theory of human capital and his economic theory of the family, or more dynamic game theoretical considerations with several iterations.

[49] Sometimes also a comparative-static analysis is used, where it is assumed that the direction on which an equilibrium is expected to move in response to exogenous changes in ends, beliefs, or environmental constraints is known.

[50] It is not by chance that many rational choice theorists assume preferences and constraints simply as given. In this conception only the future counts and the past does not seem to be important.

[51] In rational choice theory, this assumption also applies to subsections of the individual life course.

regard to the preferences and constraints at any point in time.[52] Of course, as discussed above, many rational choice scholars simply assume preferences and constraints as unproblematically given, and they unrealistically pretend that social processes are in equilibria or, at least, always move swiftly towards them after an external upheaval is introduced (see Ultee in this volume).[53] However, after more than 20 years of empirical life course and cohort research, these assumptions seem to me more than peculiar and outdated.

Thus, when we study the dynamics of action situations both empirically and theoretically, we should instead start with the idea that we artificially open an observation window with regard to an already continuously flowing stream of social history. It is therefore impossible to empirically study the social process from scratch; this should be recognized and also reflected in analytical terms.[54] There is always a previous history before any history. Therefore, two questions become important: (1) How can we conceptualize and measure the genesis of individuals' preferences and the sccial constraints to which people are exposed up to the point in time when we begin to study an action situation? and (2) How do preferences and constraints develop over time within an (empirical or conceived) observation window?

The first question is of crucial importance because most sociological research must be based on non-experimental observations of social processes, and these processes are highly selective and historically specific (Lieberson 1985). One of the important contributions of life course studies has been to make macrosociology more sensitive towards these issues. This research focuses on peoples' life courses because at least these entities have a clear beginning, middle and end in the flow of history.[55] In particular, these studies demonstrated in many empirical analyses that the following considerations are important for our understanding of the social process (e.g., Blossfeld 1989, 1995; Mayer and Tuma 1990; Huinink 1993): (1) Life courses are highly time-related, selective, and cumulative processes that are molded by history-specific institutions and culture as well as by purposive individuals; (2) life courses always emerge and change under particular historical conditions that have to be carefully considered (period effect); (3) in modern societies, successive generations

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[52] In event history analysis this methodological problem is called "left censoring" (Blossfeld and Rohwer 1995).

[53] The equilibrium assumptions in economics and sociology have often taken attention away from a serious interest in processes of change in the social system (Tuma and Hannan 1984).

[54] It is indeed interesting to see how sociologists and rational choice proponents in particular have theorized about the question of how social order is possible at all. Most of them seem to believe that it would be possible and meaningful to develop an analytical model that restarts the social process from scratch.

[55] Making the theoretical and empirical specification of constraints and preferences less vulnerable.

start and experience their life courses in very different historical settings and therefore differ markedly (cohort effect); (4) individuals are affected by various parallel processes at different levels (i.e., there are multiple clocks and point-in-time events at the micro, intermediate and macro level); (5) not only the type of event (e.g. pregnancy) but also its timing is of importance for the courses of action (e.g. marriage); and (6) time-dependencies in specific states can be interpreted as expressions of dynamic causal processes or diffusion processes[56].

The second question of how preferences and constraints develop within an observation window is equally important because the processes just mentioned do not come to a halt at the beginning of an observation window. Individuals' actions must therefore be studied from the perspective that they interact with these processes over time. Thus, the interdependencies of individuals' social actions and structural processes at different levels have to be reconstructed.

Let's demonstrate this aspect again based on our example where the woman gets pregnant in a consensual union. With regard to the marriage decision, it seems to be important to distinguish two completely different situations at the time of the discovery of the pregnancy: (1) the preferences of the partners to marry are vague and diffuse; and (2) the couple already has had reached a decision to marry or not to marry in the case of child.

Diffuse marriage preferences and the negotiation process: For many couples in modern societies, the preferences towards marriage might be quite vague and diffuse at the beginning of the pregnancy, so that through the occurrence of a pregnancy a process of preference formation and persuasion might be initiated (Elster 1989c). Formation means that initially relatively vague preferences with regard to marriage are formed, resulting in more clear-cut preferences in a step-wise negotiation process. Persuasion means that an individual is led by a sequence of short-term improvements into preferring marriage over non-marriage, even if he/she initially vaguely preferred non-marriage over marriage.[57] In such cases, the discovery of a pregnancy engenders a process of change in preferences. This process of preference formation and persuasion will be very time-structured due to two reasons. On the one hand, the opportunity to legalize the birth of the child tends to decrease with the duration of pregnancy. At the same time the likelihood of possible medical complications (premature birth, be laid up with health problems, etc.) connected with the pregnancy and the visibility of pregnancy to other people increases. Hence, the optimal time for marriage, in the sense of the smallest risk of medical complications connected with the pregnancy and the visibility of the pregnancy to other people, is at a relatively early pregnancy phase. On the other hand, the optimum in the sense of a safe, well-thought through decision based on a negotiation process between the partners is often at a

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[56] Based on the idea that some sort of "contagion", "infection", "imitation", "conformity", "bandwagon", "norm effects", or simply social pressure drives the process under study (see Blossfeld and Rohwer 1995; Manski 1995).

[57] Or the other way around.

relatively later phase of the pregnancy.[58] Thus, there is a constant tension between these often opposing forces in the attempt to optimize the marriage timing, a tension that may often but not necessarily be connected with a considerable shift in preferences with regard to marriage. Based on these contradictory forces on the marriage decision process, one would expect that the rate of entry into marriage after the discovery of pregnancy at first increases with the duration of pregnancy and then, after reaching some maximum, decreases again as the time of birth comes closer. Of course, shortly before and after the birth, one would expect a very low marriage rate. Finally, after the birth has already taken place out of wedlock, the decision of whether or not to marry has a different quality. The child is then already "illegitimate", and the time pressure to marry has disappeared.[59] Thus, one has to again expect a relative low marriage rate some time after the birth of the child. The results of the empirical analysis of Blossfeld, Klijzing, Pohl and Rohwer (1995) show that after having controlled for several important covariates, West German women do indeed seem to follow this pattern with respect to the rate of entry into marriage. This interpretation of the time-dependence within the observation window is derived from a theoretically supposed underlying negotiation process model at the level of the non-marital couples, leading to a formation and perhaps a change in initially still unstructured preferences for marriage.[60]

Marriage decisions and the observed rate of entry into marriage: Of course, one could also argue that many couples had already decided to marry or not to marry when the pregnancy was first discovered. Thus, couples would in fact be extremely heterogeneous with regard to their baseline rate to enter into marriage when the pregnancy is observed. For example, if the consensual union population consists of two groups - one with a constantly low marriage rate[61] and the other with an increasing rate as pregnancy progresses[62] - this neglected (or unobserved) heterogeneity will then

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[58] It is very likely that after some time, there is a cut-off point where calculation stops and the partners simply have to make a still unsupported choice. This point might just as well be as close to the childbirth as possible.

[59] One could argue that the next important date that exerts pressure to reconsider the marriage decision is new pregnancy or the time of entry into school.

[60] The time-dependent dummy variables in the study of Blossfeld, Klijzing, Pohl and Rohwer (1995) therefore served as proxies for a theoretically important process that is hard (or even impossible) to measure.

[61] Only in extreme cases would one expect a marriage rate of zero.

[62] For couples who have already reached a decision to marry in the event of pregnancy there is the additional pressure to really go through with it due to the increasing risks of medical complications connected with the pregnancy (e.g. premature births) and the visibility of the pregnancy to other people. This will, of course, lead to an increasing marriage rate with the progression of pregnancy.

result in a bell-shaped marriage rate in the observation window, too (Blossfeld and Rohwer 1995). This is because at the progression of pregnancy, the composition[63] of the unmarried couples shifts towards couples being "less ready for marriage" or being "not ready for marriage" which, at first, increases and then decreases the observed rate pattern.[64]

To be able to examine these theoretical interpretations, one would need in addition to the usual available "objective" data about facts and events (i.e. the dates of entry into pregnancy and marriage), time-related information about partners' beliefs with regard to their possible future marriages and their expected outcomes, the information these actors actually take into account in making decisions, and the results of these decisions themselves (see, e.g. Liefbroer and De Jong-Gierveld 1993) [65]. Thus, for studies aiming to model individuals' choices and behavior over time, panel observations of beliefs, expectations and available information states, combined with retrospective information on behavioral events since the last sweep, appear to be a very desirable design (Blossfeld and Rohwer 1995).

3. A Dynamic Integration of Micro- and Macro-Perspectives

In this section, I want to develop a more systematic sketch of how causal relations suggested by a dynamic combination of macro and micro theories can be represented in event history models and then be better examined with temporal data.

Max Weber's Pioneering Work

The epistemological justification for a combination of micro- and macro-level approaches rests on Max Weber's ideas that complete sociological explanations have

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[63] See also DeGraf, Nieuwbeerta and Heath (1995) for a similar discussion with respect to voting behavior.

[64] Thus, if we do not know whether the couples have already reached a decision to marry in the case of a child at the time of pregnancy, we are not able to say whether the effects of the dummy variables must be considered as proxies for the formation of couples' decisions during pregnancy or for the heterogeneity of couples' marriage decisions at the beginning of pregnancy. Obviously, both interpretations may be valid in reality. However, the important conclusion is that the discovery of a pregnancy leads to a changing marriage rate for most couples within the observation window.

[65] It is very important to also record the timing of decisions. For example, it could happen that a couple first decides to marry; then, following this decision, the woman becomes pregnant, and finally the couple marries. In this case, we would observe pregnancy occurring before marriage and assume that pregnancy increases the likelihood of marriage. However, the time order between the events is exactly the other way around: the couple decides to marry and then the woman gets pregnant.

to combine two different methods[66]: Erklären (the establishment of statistical associations between observable events[67]) and Verstehen (the theoretical specification of relationships between observable events, typical actors' intentions and their purposive actions). Consequently, successful sociological explanations must rely on both, on empirical correlations between events and causal mechanisms helping us to understand why people in specific situations act in a typical way producing a statistical relationship (Elster 1989c; Stinchcombe 1991; Kiser and Hechter 1991; Hedström and Swedberg 1995 and in this volume).

Sociological explanations can therefore fail in two respects: (1) If we are not in a position to say something about the frequency (or probability) of a specific type of situation and its outcomes, then we cannot assess the sociological relevance or explanatory power of a supposed causal mechanism, regardless of how well we theoretically understand a particular situation;[68] and (2) if we are not able to specify a theoretical mechanism, then we cannot understand the sociological meaning of an observed covariation between variables, independently of how strong this association may be.[69] Of course, to avoid pure storytelling (Hedström forthcoming)[70], a causal

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[66] "Kausale Erklärung bedeutet also die Feststellung: daß nach einer irgendwie abschätzbaren, im - seltenen - Idealfall: zahlenmäßig angebbare, Wahrscheinlichkeitsregel auf einen bestimmten beobachteten (inneren oder äußeren) Vorgang ein bestimmter anderer Vorgang folgt... Eine richtige kausale Deutung eines konkreten Handelns bedeutet: daß der äußere Ablauf und das Motiv zutreffend und zugleich in ihrem Zusammenhang sinnhaft verständlich erkannt sind. Eine richtige kausale Deutung typischen Handelns ... bedeutet: daß der als typisch behauptete Hergang sowohl (in irgendeinem Grade) sinnadäquat erscheint wie (in irgendeinem Grade) als kausal adäquat festgestellt werden kann. Fehlt die Sinnadäquanz, dann liegt selbst bei größter und zahlenmäßig in ihrer Wahrscheinlichkeit präzis angebbarer Regelmäßigkeit des Ablaufs ... nur eine unverstehbare ... statistische Wahrscheinlichkeit vor. Andererseits bedeutet für die Tragweite soziologischer Erkenntnisse selbst die evidenteste Sinnadäquanz nur in dem Maß eine richtige kausale Aussage, als der Beweis für das Bestehen einer (irgendwie angebbaren) Chance erbracht wird, daß das Handeln den sinnadäquat erscheinenden Verlauf tatsächlich mit angebbarer Häufigkeit oder Annäherung (durchschnittlich oder im 'reinen' Fall) zu nehmen pflegt." (Weber 1972:5-6).

[67] Of course, this association should not be spurious.

[68] Rational choice theorists often start their explanations at the individual level, and they do not pay any attention as to whether these situations actually recur in approximately the same form. Thus, they may understand the situation but simply fail to establish the sociological importance of their models.

[69] Very often sociologists using cross-sectional data and sophisticated methods of data analysis (like regression equations, path analyses, and structural equation models), only seek to "explain" the variation in the dependent variable (e.g. the

mechanism cannot be an ad hoc-interpretation or simply an ideographic account; and, as discussed above, to evade substantive emptiness, it can also not be a universal, "time-less" law (Elster 1989c).[71] Rather sociological mechanisms should be considered as elementary theoretical building blocks of limited generality tailored for a specific range of historical situations.[72] Thus, the term causal is not used here in the traditional meaning with regard to universal, "time-less" laws. It is based on systematic temporal variations and patterned regularities that themselves are a legitimate focus of our sociological understanding. This important difference will be made clearer below. The function of macro-level theories is to assist us in identifying the relevant structural events (or variables);[73] the task of micro-level theories is to help us to explain why there is a relationship between them.[74]

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proportion of variance explained). Thus, these sociologists establish the generality of a pattern but are unable to understand the relationship.

[70] I believe that all sociological explanations somehow have a character of storytelling.

[71] Several proponents of rational choice theory emphasize the importance of nomological laws in sociology (e.g. the works of Esser and Lindenberg). For example, they postulate that actors perceive courses of action and choose the action that maximizes (optimizes) their expected utility. However, as discussed above, for an empirical analysis of a concrete action situation this theory is empty because it is silent with regard to the concrete courses of perceived actions, their various utilities and the subjective probabilities attached to them (Kelle and Lüdemann 1995).

[72] The advancement of sociology could then be seen in a growing body of "knowledge of ever-more mechanisms rather than ever-better theories" (Elster 1989c).

[73] For example, macro theories may point our attention to specific processes like educational expansion, changes in the occupational, job or class structure, restructuring processes in the labor market, changing rates of unemployment, modernization processes, trends in the household structure or the dynamics of family types.

[74] For example, the rational actor model may be used to represent the principles guiding the actors' behavior in responding to macro trends and changes (Hedström forthcoming). It may help us to understand how a specific combination of individual desires, beliefs, and changes in action opportunities generate a specific action (Hedström and Swedberg 1995 and in this volume).

The Dynamics of Observed and Unobserved Processes

In my view, many of the fruitless debates and misunderstandings with regard to the relationship of macro- and micro-level[75] issues are due to the fact that sociologists often use "time-less" analytical terms and construct "time-less" theoretical models. But only if we take the time dimension more seriously, is it possible to recognize that in the dynamic interplay of structural events and individuals' choices, there is always an "earlier" and "later" that has to be defined in terms of past, present, and future (Prior 1967). "Time-less" theoretical thinking[76] neglecting the timing in the relationships necessarily will produce aporias, paradoxical problems, and belief controversies among scientists. For example, the debate of what is more important for a sociologist, institutional embeddedness or individual action (e.g. Lindenberg 1995; Coleman 1990; Blau 1994), is obviously an unnecessary question, as is the one about whether individuals' preference change engenders change in the social structure, or whether structural change leads to changing preferences. There can be no doubt that both aspects are important: institutional embeddedness and individual action, individual preferences and social structure - but there is always a time order of events in this relationship. For example, the claim that explaining behavior by reference to different preferences would be tautological (see Friedman and Hechter 1988) is, of course, only true in a time-less conception where preferences are equated with behavior.[77] However, when the dynamics of preferences and behavior respectively are measured over time, then this is not the case anymore. Actually, it seems to me that this is the only fruitful approach to empirically test propositions derived from rational choice models. Thus, we have to strive for reliable and valid time-related measures of the unobserved entities like tastes, beliefs, decision rules etc. (see Green and Shapiro 1994).[78] In particular, we must collect data on rational expectations predictions of individuals' future behavior.[79]

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[75] Blau (1994) correctly stresses that simplistic conceptions of only two levels may be highly misleading. Complex social structures normally consist of multiple levels of structure.

[76] Normally nurtured by the inferential limitations of cross-sectional data analysis (see Blossfeld and Rohwer 1995).

[77] It is interesting that rational choice proponents and economists in particular (see Manski 1995) often question the validity of measures other than behavior - actual choices - as indicators of preferences, tastes and beliefs (see Green and Shapiro 1994).

[78] Of course, this is a Pandora's box that cannot be adequately discussed in this paper (see, e.g. Ajzen and Fishbein 1980; Ajzen and Madden 1986; Ajzen 1989; Henerson, Morris and Fitz-Gibbon 1988; Manski 1995).

[79] These are respondents' best predictions of their behavior including information about (1) the awareness of the respondents about the actual process determining their future behavior and (2) the knowledge they possess at the the respective point

The Dynamics of Parallel Processes at Different Levels.

To make progress in the understanding of the dynamics of social action, we have to develop a sociological perspective that stresses such changes (or events) and their historical context. Actors should be conceptualized as individuals who intentionally decide between discrete courses of action, and these decisions and their possibly later following actions can occur at any point in time. If the dependent variable is discrete, like the outcomes of choices, and can change its state at any time, then a transition rate framework offers a time-point-related representation for causal effects (Blossfeld and Rohwer 1995).

A continuous time path of discrete intentional actions (or events) of an individual in one domain of life might be called a process. This process is normally embedded in a complex system of other parallel processes. These can operate at different levels. For example:

1. there can be parallel processes at the level of the individual in different domains of life (e.g. one may ask how upward and downward moves in an individual's job career influence his/her intentional actions in the family), cf. e.g. Blossfeld and Huinink (1991), and Blossfeld (1995);

2. there may be parallel processes at the level of some few individuals interacting with each other (e.g. one might study the effect of the careers of the husband on his wife's purposive participation in the labor force), see for instance, Bernasco (1994), Blossfeld, Drobnič and Rohwer (1995);

3. there may be parallel processes at the intermediate level (e.g. one can analyze how changing household structure determines women's intentional participation in the work force), see as an example, Blossfeld and Hakim (forthcoming);

4. there may be parallel processes at the macro level (e.g. one may be interested in the effect of changes in the business cycle on individuals choices with regard to family formation), see Blossfeld and Huinink (1991);

5. there may be any combination of processes type (1) to (4). For example, in the study of life-course, cohort and period effects, time-dependent covariates at different levels must be included simultaneously (Blossfeld 1986; Mayer and Huinink 1990). Such an analysis combines processes at the individual level (life-course change) with two kinds of processes at the macro level: (1) variations in structural conditions across successive (birth, marriage, etc.) cohorts, and (2) changes in particular historical conditions affecting all cohorts in the same way.

In event history analysis, time-dependent covariates have been used to include the sample path of parallel processes in transition rate models. In the literature however

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in time (Manski 1995).

only two types of time-dependent covariates have been described as not being subject to reverse causation (see e.g. Kalbfleisch and Prentice 1980; Tuma and Hannan 1984; Blossfeld, Hamerle, and Mayer 1989; Yamaguchi 1991; Courgeau and Lelièvre 1992):

1. Defined time-dependent covariates whose total time path (or functional from of change over time) is determined in advance in the same way for all subjects under study. For example, process time like age or duration in a state (e.g. duration of marriage in divorce studies), is a defined time-dependent covariate because its values are predetermined for all the subjects. Thus, by definition, the values of these time-dependent covariates cannot be affected by the dependent process under study.

2. Ancillary time-dependent covariates whose time path is the output of a stochastic process that is external to the units under study.[80] Again, by definition, the values of these time-dependent covariates cannot be influenced by the individual actor themselves. Examples of time-dependent covariates that are approximately external in the analysis of individual life courses are variables that reflect changes at the macro level of society (unemployment rates, occupational structure, etc.) or the population level (composition of the population in terms of age, sex, race, etc.), provided that the contribution of each actor is small and does not really affect the structure in the population (Yamaguchi 1991).[81]

In contrast to defined or ancillary time-dependent covariates, internal time-dependent covariates have been referred to as being problematic for causal analysis of social processes (e.g. Kalbfleisch and Prentice 1980; Tuma and Hannan 1984; Blossfeld, Hamerle, and Mayer 1989; Yamaguchi 1991; Courgeau and Lelièvre 1992). An internal time-dependent covariate Y_t^B describes a stochastic process, considered in a causal model as being the cause, that is in turn affected by another stochastic process Y_t^A, considered in the causal model as being the effect. Thus, there are direct effects in which the processes autonomously affect each other (Y_t^B affects Y_t^A and Y_t^A affects Y_t^B), and there are "feedback" effects, in which these processes are affected by themselves via the respective other process (Y_t^B affects Y_t^B via Y_t^A and Y_t^A affects Y_t^A via Y_t^B). In other words, such processes are interdependent and form what has been called a dynamic system (Tuma and Hannan 1984). Interdependence is typical at the individual level for processes in different domains of life and at the level of few individuals interacting with each other (e.g. strategic or game-theoretic actions in the case of career trajectories of partners; see, e.g., Elster 1979). For example, the empirical literature suggests that the employment trajectory of an individual is influenced by his/her marital history and marital history is dependent on the employment trajectory.

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[80] In Elster's (1979) terminology, this is parametric rationality or parametric action.

[81] For example, consider the changes in the occupational structure. While a job move by an individual might contribute to the change in the occupational structure, its effect on the job structure is negligibly small.

Blossfeld and Rohwer (1995) have proposed a causal approach to interdependent systems that provides a straightforward solution to (1) the simultaneity problem of interdependent processes, (2) the identification of lags between causes and their effects, (3) the study of temporal shapes of effects, and (4) the dynamic integration of macro and micro perspectives. I will outline this approach in more detail in the following.

Causes and Time-Dependent Covariates

In an influential paper, Holland (1986) developed the idea that causal statements imply counterfactual reasoning: If the cause had been different, there would have been another outcome, at least with a certain probability. However, the consequences of conditions that could be different from their actual state are obviously not empirically observable.[82] This means that it is simply impossible to observe the effect that would have happened on the same unit of analysis, if it were exposed to another condition at the same time.

Because causal relationships are inherently time-related connections, Blossfeld and Rohwer (1995) suggested to look in empirical applications at conditions which actually do change in time.[83] For example, a time-constant variable "gender" should ideally be replaced in an empirical analysis by time-changing events assumed to produce sex-specific differences in the life history of men and women. Of course, in empirical research that is not always possible, so that very often one must rely on time-constant "variables" as well. However, it is important to recognize that for these variables the implied longitudinal causal relation is not examined. For example, if we observe an association among people with different levels of educational attainment and their job opportunities, then we can normally draw the conclusion that changes in job opportunities are a result of changes in educational attainment level. The implied idea is the following: If we started having people with the lowest educational attainment level and followed them over the life course, they would presumably differ in their rates to attaining higher levels of educational attainment and this would produce changes in job opportunities. Whether this would be the case for each individual is not very clear from a study based on people with different levels of educational attainment. In particular, one would expect that the causal relationship (or causal mechanism) between education and job opportunities would radically be altered if all people acquired a higher (or the highest) level of educational attainment. Thus, the two statements - the first about associations across different members of a population and the second about dependencies in the life course for each individual member of the population - are quite different; one type of statement can be empirically true while the other can be empirically false. Therefore, statements of the first type cannot be regarded as substitutes for statements of the second type. However, since all causal propositions have consequences for longitudinal change (see Lieberson 1985), only

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[82] Holland (1986) calls this "the fundamental problem of causal inference."

[83] These changes can occur in discrete and continuous types of processes.

time-changing variables provide a more convincing empirical evidence of causal relations.

These changes are events. More formally, an event is a change in a qualitative or quantitative variable, and this change must happen at a specific point in time. The most obvious empirical representation of causes is therefore in terms of variables that can change their states over time. In event history analysis, this statement is linked very naturally with the concept of time-dependent covariates. The role of a time-dependent covariate in this approach is to indicate that a (qualitative or metric, direct or indirect observable) causal factor has changed its state at a specific time and that the unit under study is exposed to another causal condition.

Form this point of view, it seems somewhat misleading to regard processes or states of processes as causes. Instead, only events, or changes in a state variable, can sensibly be viewed as possible causes.

Time and Causal Effects

Consequently, we would not say that a process Y_t^A is a cause of a process Y_t^B, but that a change in Y_t^A could be a cause (or provide a new condition) of a change in Y_t^B. Or more formally:

$$\Delta Y_t^A \rightarrow \Delta Y_{t'}^B \qquad t < t'$$

meaning that a change in process Y_t^A at time t is a cause of a change in variable $Y_{t'}^B$ at a later point in time, t'. It is not implied, of course, that Y_t^A is the only cause which might affect $Y_{t'}^B$. So we should speak of causal conditions to stress that there might be, and normally is, a quite complex set of causes. A change in variable Y_t^A is therefore always measured relative to other causes. As noted by Marini and Singer (1988), a conjunctive plurality of causes occurs if various factors must be jointly present to produce an effect. A disjunctive plurality of causes, on the other hand, occurs if the effect is produced by each of several factors alone, and the joint occurrence of two or more factors does not alter the effect.[84] These considerations are important because in my view they provide the main reason for a time-dependence of causal mechanisms in sociology. They are always relative to a history-specific constellation of other causes. A causal mechanism may change or even disappear in the course of history because of changes in the setting of other important causes. Thus, if causal mechanisms are studied empirically, they must intrinsically be related to historical time. There are several further important aspects.

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[84] See the extensive discussion by Marini and Singer (1988).

Time Axis and Events

First, to speak of a change in variables necessarily implies reference to a time axis. We need at least two points in time to observe that a variable has changed its value. Of course, at least approximately, we can say that a variable has changed its value at a specific point in time.[85] Therefore, we use symbols to refer to changes in the values of the time-dependent variable ΔY_t^A and the state variable ΔY_t^B at time t. This leads to the important point that causal statements relate changes in two (or more) variables.

Time Order, Time Intervals, and Apparent Simultaneity

Second, there is a time ordering between causes and effects. The cause must precede the effect in time: $t < t'$, in the formal representation given above. This seems to be generally accepted.[86] As an implication, there must be a temporal interval between the change in the variable representing a cause, and the change in the variable representing a corresponding effect. Thus, the role of time in causal explanations does not only lie in specifying a temporal order in which the effect follows the cause in time. It additionally implies that a temporal interval is necessary for the cause to have an impact (Kelly and McGrath 1988). It takes some finite amount of time for the cause to produce the effect. The time interval may be very short or very long, but can never be zero or infinity (Kelly and McGrath 1988). In other words, there can never be a simultaneity of cause and its effect.

Some effects take place almost instantaneously. For example, if the effect occurs at microsecond intervals, then the process must be observed in these small time units to uncover causal relations. However, some effects may occur in a time interval too small to be measured by any given methods, so that cause and effect seem to occur at the same point in time. Apparent simultaneity is often the case in those social science applications where basic observation intervals are relatively crude (e.g. days, months, or even years), such as, for example, yearly data about first marriage and first childbirth (Blossfeld, Manting, and Rohwer 1993). Other effects need a long time until they start to occur. Thus, there is a delay or lag between cause and effect that must be specified in an appropriate causal analysis. Unfortunately, in most of the current

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[85] Statements like this implicitly refer to some specification of "point in time." The meaning normally depends on the kind of events which are to be described, for instance, a marriage, the birth of a child, or becoming unemployed. In event history text books, a continuous time axis for purposes of mathematical modeling is normally assumed (see Blossfeld and Rohwer 1995). This should however be understood as an idealized way of representing social time. Here we are using mathematical concepts to speak about social reality, so we will disregard the dispute about whether time is "continuous" (in the mathematical sense of this word), or not (see also Abbott 1992).

[86] See, for instance, the discussion in Eells (1991, Ch.,5).

rational choice theories and interpretations of research findings this interval is left unspecified.

Temporal Shapes of the Unfolding Effect

This immediately leads to a third point. There might be different shapes of how the causal effect Y_t unfolds over time. While the problem of time-lags is somehow recognized in the literature on methods in sociology, almost no attention has been given to the temporal shapes of effects (Kelly and McGrath 1988). Sociologists often seem to be quite ignorant about the fact that causal effects could be highly time-dependent, too. They normally assume that there is an almost all-at-once change in the dependent variable that is then maintained. However, the effect may be very time-dependent too. For example, (1) it may gradually increase; (2) at first rise, reach a maximum and then decrease; or (3) show a cyclical pattern over time (see Blossfeld and Rohwer 1995). Thus, an appropriate understanding of causal relations between variables should take into account that the causal relationship itself may change over time. This seems particularly important in sociological applications of causal reasoning. In these applications we generally cannot rely on the assumption of eternal, time-less laws but have to recognize that the causal mechanisms may change during the development of social processes. In fact, analyses of these changes of mechanisms is usually what is of particular interest in sociology.

The Principle of Conditional Independence

Combining these ideas, a causal view on parallel and interdependent processes becomes easy, at least in principle. Given two parallel processes, Y_t^A and Y_t^B, a change in Y_t^A at any (specific) point in time t' may depend on the history of both processes up to, but not including t'. Or stated in another way: what happens with Y_t^A at any point in time t' is conditionally independent of what happens with Y_t^B at t', conditional on the history of the joint process $Y_t = (Y_t^A, Y_t^B)$ up to, but not including t'. Of course, the same reasoning can be applied if one focuses on Y_t^A instead of Y_t^B as the "dependent variable." Blossfeld and Rohwer (1995) call this the principle of conditional independence for parallel and interdependent processes.[87]

The same idea can be developed more formally in the event history framework. Beginning with a transition rate model for the joint process, $Y_t = (Y_t^A, Y_t^B)$, and assuming the principle of conditional independence, the likelihood for this model can be factorized into a product of the likelihoods for two separate models: a transition rate model for Y_t^A which is dependent on Y_t^B as a time-dependent covariate, and a

[87] The terminology is adapted from Gardner and Griffin (1986), and Pötter (1993).

transition rate model for Y_t^B which is dependent on Y_t^A as a time-dependent covariate.[88] Estimating the effects of time-dependent (qualitative and metric) processes on the transition rate (or action process) can then easily be achieved by applying the method of episode splitting (see Blossfeld, Hamerle, and Mayer 1989; Blossfeld and Rohwer 1995).

Actors, Probabilistic Causal Relations and the Hazard Rate

If sociological phenomena are always directly or indirectly based on actions of individuals, then sociology cannot only deal with associations among variables (e.g. pregnancy/birth and marriage) per se, but with variables that are associated via acting people. There are at least three consequences for the empirical analysis of causal relations in the social sciences:

First, if individuals relate causes and effects through their actions, then explanation of social processes should be related to individuals (principle of methodological individualism). This is why life history data on individuals, and not aggregated longitudinal data, provide the most appropriate empirical evidence for hypotheses about social change. It is only with these data that one can trace the courses of action at the level of each individual over time.

Second, as discussed in detail above, the explaining or understanding of social processes requires (see Elster 1979): (1) a time-related specification of structural constraints which cut down the set of abstractly possible courses of action to a vastly smaller subset of feasible actions[89]; and (2) mechanisms that single out which of the feasible courses of action shall be realized. Because this is done by individuals, these mechanisms must rest on the tastes, beliefs, expectations and constraints of the agents. In particular, it must be based on rational- expectations. "The term rational-expectations....should not be confused with the unrelated concept of rational choice. A person giving a rational-expectations response to an intentions question would begin by recognizing that future behavior will depend in part on conditions known at the survey and in part on events that have not yet occurred" (Manski 1995; 102-103).

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[88] The mathematical steps leading to this factorization are, in principle, very easy but unfortunately need a complex terminology. The mathematical apparatus will therefore not be given here. The mathematics can be found in Blossfeld and Rohwer (1995), Gardner and Griffin (1986), Pötter (1993), and Rohwer (1995). An important implication is that since not only the states, but also functions of time (e.g. duration) can be included conditionally, the distinction between state and rate dependence proposed by Tuma and Hannan (1984) loses its meaning (see also Pötter 1993).

[89] Here, we must be careful because by taking constraints as given we tend to ignore the case that individuals sometimes do not choose among the given alternatives, but try to either open more for themselves or close some to other people (see Gambetta 1987).

However, the future evolutions of these conditions cannot be predicted by the respondent with certainty. Thus, if we really want to test propositions derived from rational choice models, we have to gather additional time-related data on these unobservable entities. Since it is well known that retrospective questions concerning motivational, attitudinal, cognitive or affective states are particularly problematic, the collection of panel observations of these states, combined with retrospective information on behavioral events since the last panel wave, seems to be an appropriate and feasible data collection design.[90]

Against such causal analytical studies, it is sometimes argued that since human actors act intentionally and behavior is goal-oriented, the intentions or motives of actors to bring about some effect in the future causes the actor to behave in a specific way in the present (Marini and Singer 1988). This does not however contradict our causal view. One simply has to distinguish intentions, motives or plans as they occur in the present from their impact on the behavior which follows their formation temporally, and from the final result, as an outcome of the behavior. An expectation about a future state of affairs should clearly be distinguished from what eventually happens in the future. Therefore, the fact that social agents can behave intentionally, based on expectations, does not reverse the time order underlying our causal statements.

Third, if it is individuals that are doing the acting, then causal inference must also take into account the free will of individuals.[91] This introduces an essential element of indeterminacy into causal inferences. Hence, in sociology we can only reasonably account for and model the generality but not the determinacy of behavior. The aim of substantive (and statistical) models must therefore be to capture common elements in the behavior of people, or patterns of action that recur in many cases (Weber 1972; Goldthorpe in this volume). Theoretical models in sociology must not seek to explain the behavior of single individuals, but the behavior of aggregate entities such as groups. In other words, in social science applications, randomness has to enter as a defining characteristic of causal models. We can only hope to make sensible causal statements about how a given or (hypothesized) change in variable Y_t^A (e.g.

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[90] In the past, social psychologists in particular have expected too much correspondence between stated intentions and subsequent behavior. They have written that intentions and behavior should coincide. For example, Ajzen and Fishbein (1980:50) write, "we are claiming that intentions should always predict behavior". Demographers, on the other hand, have contended that individual-level divergences between intentions and behavior should average out in the aggregate. However, in reality, both premises are flawed. Intentions and behavior may diverge substantially, both at the individual level and in the aggregate, whenever behavior depends on events not yet realized at the time of the survey. This is the case even if intentions data provide the best predictions of behavior that can be made, given the information available when the survey is performed (Manski 1995: 109).

[91] By "free will" of individuals, I mean they are free agents with wills of their own. They are not pre-determined by processes which they do not control, but they can act according to any idea.

pregnancy/birth) in the past affects the probability of a change in variable $Y_{t'}^{B}$ (e.g. marriage) in the future. Correspondingly, the basic causal relation becomes

$$\Delta Y_t^A \rightarrow \Delta Pr\ (\Delta Y_{t'}^B) \qquad t < t'$$

In the social sciences, this interpretation seems more appropriate than the traditional deterministic approach. The essential difference is not that our knowledge about causes is insufficient, allowing only probabilistic statements (see Lieberson 1991), but that the causal effect to be explained can only be a probability. Thus, probability in this context is not just a technical term anymore, but must be considered a theoretical one: it is the propensity of social agents to change their behavior intentionally.

Using event history data and hazard rate models, the causal reasoning underlying our approach can therefore be restated in a somewhat more precise form as

$$\Delta Y_t^A \rightarrow \Delta r(t') \qquad t < t'$$

As a causal effect, the changes in covariates Y_t^A in the past may lead to changes in the transition rate r(t') in the future, which in turn describes the propensity that the actors under study will change their course of action. This causal interpretation requires that we take the temporal order in which the structural constraints evolve and the actors with their time-related beliefs and motivations seriously.

4. Concluding Remarks

During the last 15 years, there has been an explosion of rational choice scholarship in the social sciences. The purpose of this paper has been to discuss some of the reasons why this development has had surprisingly little influence on large-scale data analysis. My thesis is that in the process of establishing rational choice theory as the only coherent and unified sociological approach, its proponents have pigeonholed their rivals, caricatured competing theories, exaggerated existing theoretical cleavages, overlooked their own conceptional weaknesses, downplayed the difficulties of their empirical applications, and neglected more recent and actually quite successful theoretically driven research programs based on longitudinal data.

Because rational choice theory is fairly established in sociology today, the chances are quite good that the current unproductive dualism between macro-level and micro-level approaches could be overcome. Theoretically powerful sociological analyses must pay attention to both structural- and micro-level issues. However, not in the usual static way. Any macro-micro framework must recognize that time matters in this relationship. It must identify the particular historical structures and processes which dominate the changes occurring in a given population and it has to specify the causal mechanisms that allow us to trace the encounters of intentionally acting individuals with the flow of history as a series of choice processes. An important advancement in this respect has been that longitudinal data can be studied by new statistical methods in a stepwise time-related fashion. Event history analysis provides effective tools to test causal propositions derived from a dynamic combination of micro- and macro-level

considerations. What is still largely missing are more systematic time-related data collection efforts based on rational choice conceptions, covering data not only on behavior but also on tastes, beliefs, expectations as well as decisions. This type of sociological research is not easy to conduct and is still at its rudimentary beginnings. But only such studies will allow us to achieve a more rigorous empirical analysis of rational choice propositions and enable us to find out whether rational choice thinking really means progress in applied research.

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Sonderforschungsbereich 186
der Universität Bremen

Statuspassagen und Risikolagen im Lebensverlauf

Macrosociology, Rational Choice Theory and Time

A Theoretical Perspective on the Empirical Analysis of Social Processes

von

Hans-Peter Blossfeld

Arbeitspapier Nr. 35

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Preface

The B6 project within the Special Collaborative Program on "Status Passages and Risks in the Life Course" examines the time-related interplay between macro-institutional changes (e.g. industrialization, changes in occupational structure, educational expansion, expansion of the welfare state), temporal organization of individual life courses (e.g. age-grading, timing of job shifts and educational attainment) and the formation, continuation and dissolution of households and families. The relationship between macro-level structural change and micro-level individual rational action is therefore at the heart of the project's theoretical interest.

In the first part of this paper, Blossfeld discusses some of the historical reasons why the explosion of rational choice scholarship in the social sciences has had surprisingly little influence on macro-sociological data analysis. In the second part, he shows that any theoretically powerful sociological analysis of a macro-sociological problem must pay attention to both structural- and micro-level issues but not in the usual static way. Any macro-micro framework must recognize that time is significant in this relationship. It must identify the particular historical structures and processes that dominate the changes occurring in a given population, and it must specify the causal mechanisms that allow us to trace the encounters of intentionally acting individuals with the flow of history as a series of choice processes. Applying the project's research to consensual unions, he demonstrates his general theoretical arguments by giving concrete examples.

Prof. Dr. Ansgar Weymann
Chair, Special Collaborative Programme No. 186

Table of Contents

1. Introduction

Since the early 1980s, there has been an explosion of articles and books about the need for rational choice approaches in sociology.[1] As a consequence of this, rational choice theories[2] have rapidly grown in complexity and sophistication. Although these approaches primarily aim to improve our understanding of real world phenomena, it is surprising how little impact they have had on empirical social research in general (see, e.g. Green and Shapiro 1994) and on large-scale data analysis in particular (Goldthorpe in this volume).

In this paper, I first want to discuss some of the reasons for this development in the field of quantitative macrosociological analysis. My thesis is that the ambitious endeavor of rational choice proponents to establish a "new"[3] theoretical paradigm in sociology has led to the creation of camps and fairly artificial antagonisms between a rational choice perspective and all the other types sociological approaches.

Since rational choice theory is fairly established in sociology today, the time may be ripe for more relaxed considerations which could help to overcome an unproductive dualism between macro-level and micro-level approaches in the field of large-scale data analysis.[4] The objective of this paper is to achieve some progress in this respect. I contend that only few successful empirical studies of a macrosociological problem can concentrate on structural or micro approaches alone. Instead, a theoretically powerful sociological analysis must pay attention to both structural- and micro-level

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[1] To mention only some of many important publications: Coleman (1986, 1990), Coleman and Fararo (1992), Elster (1979, 1986, 1989a, 1989b, 1989c), Esser (1990, 1991, 1993), Esser and Troitzsch (1991), Friedman and Hechter (1988), Gambetta (1987), Heath (1976), Hechter (1983, 1987), Hedström and Swedberg (1995), Kiser and Hechter (1991), Lindenberg (1982, 1985, 1989, 1990), Opp (1986), Raub and Voss (1981), Voss (1985), Wippler and Lindenberg (1987).

[2] I use the term rational choice theory loosely to include rational action theory (e.g. Abell 1992), utilitarian or economic conceptions of man (e.g. Lindenberg 1985), as well as strategic or game-theoretic modes of thinking (e.g. Elster 1979).

[3] Actually, the lines of thought can be traced back to classical authors in economics and sociology.

[4] For the need to link macro- and micro-perspectives, see Stinchcombe (1968), Sørensen (1977), Hechter (1983), Tilly (1984), Granovetter (1985), Coleman (1986), Friedman and Hechter (1988), Esser (1991), Oppenheimer (1994), Blau (1994), Hedström (forthcoming), Hedström and Swedberg (in this volume), or Goldthorpe (in this volume).

issues. However, this macro-micro framework[5] must recognize from the outset that time matters in this relationship. It must achieve two goals: (1) it must identify the particular historical structures and processes which dominate the changes occurring in a given population, i.e., the sociologically important dependent and independent variables;[6] and (2) it has to specify the causal mechanisms that allow us to trace the encounters of intentionally acting individuals with the flow of history as a series of choice processes.

The invaluable function of time in this respect is to offer a continuously changing point of reference by distinguishing, conceptionally and empirically, between a closed (but always changing) past, the respective presentness, and an intrinsically open future. Good sociological theories should not only allow us to explain (or understand) a given outcome at present with reference to the closed past, but also help us to predict outcomes in an uncertain future with reference to the known past and present conditions. In my view, the crucial empirical test of sociological theories is not the extent to which they help us to explain a given outcome ex post facto, but the degree to which they also yield successful predictions of individuals' actions and their outcomes ex ante.[7]

Over the last 15 years, modern longitudinal social research has made great progress in assessing causal inferences based on sociological theories more adequately.[8] Life course and panel studies have collected time-related data over substantial blocks of space and historical time. In methodological terms, the most important but still fairly unrecognized advancement that has been made is that longitudinal data can be studied by new statistical methods in a stepwise time-related fashion. They allow us to follow up a great number of individuals belonging to different cohorts over longer spans of time and to differentiate at each point in time between a closed past, the presentness, and an intrinsically open future (Blossfeld and Rohwer 1995). My intention in this paper is to demonstrate how causal relations suggested by a dynamic combination of macro and micro theories can be represented in event history models and tested with temporal data.

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[5] As I will discuss below, I agree with Blau (1994) that Coleman's (1990) micro-macro transition needs to be reversed into a macro-micro transition.

[6] Rather than assume abstractly specified processes such as differentiation, individualization, or concentration (see Tilly 1984).

[7] With regard to theory, Elster (1989a) distinguishes determinacy and adequacy. A theory is indeterminate when and to the extent that it fails to yield unique predictions. It is inadequate when its predictions fail.

[8] In these studies the point of reference that distinguishes a posteriori and a priori is not the survey date anymore, but may be any point in time within an observation window covered by a longitudinal study (Blossfeld and Rohwer 1995).

2. Why Has Rational Choice Theory Not Been Very Successful in Large-Scale Data Analysis?

Let me first consider the reasons for the obvious fact that the influence of rational choice theory on quantitative macrosociology has been surprisingly small (see also Goldthorpe in this volume). My thesis is that in the process of establishing rational choice theory as a "new" theoretical paradigm in sociology, its proponents have tended to pigeonhole their rivals, to caricature competing theories, to exaggerate existing theoretical cleavages, to overlook their own conceptional weaknesses, to downplay the difficulties of their empirical applications, and to neglect more recent and actually quite successful theoretically driven research programs based on longitudinal data.[9]

Of course, there is not only one single rational choice theory but perhaps as many different versions as there are protagonists.[10] There has also been an important shift from earlier crude models with fairly unrealistic behavioral assumptions towards more recent theories elaborating the role of heterogeneous preferences, the effects of uncertainty, the impact of structural constraints, the relationship between norms and rational choice, and the possibilities of the non-existence of a rational choice. No doubt, this development has made rational choice approaches increasingly attractive for empirical practitioners. However, the result of the aspiration to establish rational choice theory as the only coherent and unified theoretical approach in sociology has been the creation of a scientific camp mentality which unfortunately almost completely disregards rational choice approaches in large-scale data analysis. Using a concrete example of my recent research on consensual unions, I want to demonstrate this in more detail here.

Attacking Outdated and Empirically Unimportant Theories

Rational choice theorists have frequently been polemical against specific sociological conceptions which rarely had but certainly almost completely lost their influence on empirical studies today. For example, proponents of rational choice theory enjoy criticizing the homo sociologicus[11], extreme normative sociological conceptions[12],

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[9] The most important examples are life course, cohort and panel research.

[10] After reviewing the rational choice literature for this paper, I was increasingly confused by the great number of obviously contradicting propositions, theoretical statements and hypotheses discussed in this field. The only common denominator seems to be a commitment to purposive individualism: an epistemological position that social phenomena can only be explained in terms of intentional actions of individuals. But even this position is not shared by all rational choice theorists. Some of them do not use individuals as the unit of analysis but treat states or firms as corporate actors (see the discussion in Friedman and Hechter 1988).

[11] For example, the critique of Lindenberg (1985, 1990) or Esser (1987, 1989, 1990, 1991) with regard to the conception of a socially determined homo sociologicus is

crude functionalism, or more elaborated models of structural-functionalism[13]. But as far as I can see, all of these theories, though still discussed in theoretical sociological seminars, have turned out to be fairly irrelevant in contemporary empirical research.[14] Thus, even if the theoretical critique of rational choice proponents is justified, it could not be very consequential for the conduct of concrete empirical social research today.

I want to demonstrate this point with a concrete example from my recent research where my colleagues and I analysed the question of why people living in consensual unions marry if there is a pregnancy (Blossfeld, Klijzing, Pohl and Rohwer 1995). In an extreme version of the normative model, one would have to assert the dominance of normative constraints and simply deny the importance of a choice at all. Thus, with the occurrence of a pregnancy in a consensual union, norms would have the effect of cutting down the feasible set of actions to a single point, i.e. marriage. Today's cohabitating men and women would therefore be portrayed as mindlessly repeating or imitating what the ancestors did in the past in similar situations (see Elster 1989b). But as a serious theory of marriage action this model is obviously too wrong to merit any empirical analysis. Hence, it is not surprising that, to the best of my knowledge, there is no empirical researcher who has shaped his/her analysis of this problem on the basis of such a strong normative conception.

Rejecting an extreme normative approach in empirical studies however does not mean that norms (and culture) do not matter. Rather it is my view that norms are extremely important. Social interactions are intrinsically symbolic relationships that have a meaning and can therefore not be understood without reference to cultural settings.[15] Yet in their fierce attempt to push for a duality between an intentionally acting person

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justified, but I actually do not know any contemporary empirical researcher who would work with this strong version of the homo sociologicus in his/her empirical study.

[12] For example, Elster (1989b) rightly declines the extreme version of the normative model because people would then simply stick to prescribed behavior even if new and apparently better options become available. But I do not see that such a caricature of man as a pure passive executor of inherited norms would be the theoretical basis of any empirical analysis today.

[13] For example, Coleman (1986, 1990), Elster (1979) or Hechter (1987) convincingly reject functional and structural-functional explanations because these theories have no place for individuals, and purpose (or any regulative idea) must be rejected at the system level. But which serious empirical researcher of social phenomena would still employ such theories of the 1960s and early 1970s?

[14] Of course, this observation reflects the huge gap between theory and empirical research in today's sociology.

[15] For example, Ferejohn (1991) suggested that rational choice approaches have to be complemented by cultural theories to be more successful.

guided by instrumental rationality and a passive executor of social norms (or culture), rational choice theorists often lose sight of the fact that norms (culture) and rational choices are important in empirical applications.[16] The important theoretical issue for empirical analyses is therefore not whether social norms (culture) or instrumental rationality provide the motivation for actions[17], but how they can be conceptionally integrated so that we are better able to understand real life situations.[18]

For example, in the research application mentioned above, values, social norms, and traditions certainly have an important impact upon people's marriage behavior in the case of a pregnancy, but in most cases this influence is likely to be mediated through the intentional actions of individuals. It is therefore plausible that there is a changing, frequency-dependent[19] coexistence of norm-guided behavior and rational, self-centered behavior with regard to the decision to marry when a pregnancy occurs in a consensual union (cf. Elster 1989b). In such a hybrid model of empirical application, social norms do not dictate the marriage behavior, but allow a deliberate, reflective imitation of traditions. This is because social norms normally offer a considerable scope of interpretation and manipulation. Social norms' main function might be to focus and coordinate expectations (Elster 1989b). Thus, when the norm "If the woman gets pregnant, then marry" is still shared within a community, people will to a certain degree expect each other to do that. In particular Elster (1989b) has stressed that the coordinating function of norms is mainly due to the strong emotions that their violations can trigger in the violator himself and also in other people. Thus, the social norm "If the woman gets pregnant, then marry" is likely to be sustained by the feelings of embarrassment, anxiety, guilt and shame that a person suffers at the prospect of violating it. Of course, such emotions may or may not help unmarried couples to reach a marriage decision when the woman is pregnant, and they certainly will rarely be the only motivation for such an important and long-term decision. But this concrete research example illustrates that our understanding of the relationship between norms and intentional action is only in its rudimentary beginnings and that rational choice theory simply must provide better analytical concepts in this regard, if it is to serve as a powerful instrument in empirical applications.

Aspirations to Universal ("Time-Less") Theories

Many (but fortunately not all) rational choice theorists adopt a rigid version of the modern philosophy of science (Green and Shapiro 1994). They strive for general

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[16] See, for example, Opp (1986) who comes to a similar conclusion in his empirical application.

[17] "Norms do not usefully contrast with self-interest." (Lukes 1991:148).

[18] See, for example, the interesting papers by Lindenberg (1983), Heiner (1983), and Lukes (1991).

[19] The probability that people will follow a social norm at time t' is very likely to be dependent on the degree of conformity in a social context at time t ($t < t'$).

causal theories and universal laws (e.g. Lindenberg 1985; Esser 1993) and think little about "historicistic analyses" and "inductive generalizations" (e.g. Kiser and Hechter 1991). Regardless of how one values the merits of historicism and induction in sociology[20], by no (logical) means are sociologists forced to accept only a choice between statements about universal laws or statements about accidental, contingent historical relationships. Rather, sociologists can legitimately try to establish causal mechanisms of limited generality tailored to a specific range of historical situations (e.g. Gambetta 1987; Elster 1989c; Hedström and Swedberg 1995 and in this volume). I will develop this perspective in more detail in the next section.

Yet the strong aspiration to develop general theories and universal laws of social action may be one of the reasons why many sociologists consider rational choice theory to be empirically unappealing. In particular, the mainstream version of this approach "explains" people's rational actions with regard to universal and stable general human preferences and considers constraints as exogeneously given (Stigler and Becker 1977; Becker 1981; Lindenberg 1985, 1990). However, if preferences are universal and stable among individuals (Stigler and Becker 1977; Becker 1981; Lindenberg 1985, 1990), they must turn out to be simply irrelevant for explaining differences in peoples' behavior (Gambetta 1987).[21] In this model, individuals' particular "tastes" or their marginal utilities, for specific courses of actions can therefore only be derived from the constraints (or opportunities) in concrete social situations. Thus, economically rational individuals may be portrayed as passive agents, with no more outstanding intentions than to adjust optimally to changing constraints.[22] However, without specifying the concrete constraints and their changes in time and space, the theoretical model is necessarily empty (Kelle and Lüdemann 1995). The trick is to distill into an explanation the important constellation of factors in a situation and their relations. The question is not whether to abstract from the complexity of the social reality (see e.g. Lindenberg 1985) but whether the appropriate abstraction has been done. Thus, "if an abstract theory has explanatory power, this is not merely because it is abstract, but because the abstraction in question captures the essence of what is going on causally" (Green and Shapiro 1994:191).

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[20] As noted by Oppenheimer (1994), good sociological research is normally characterized by constantly going back and forth between theoretical and empirical analyses (between deduction and induction).

[21] For example, Lindenberg (1985, 1986, 1990) further developed Becker's theory to what he calls a "social production function approach", assuming that there are at least two ultimate human goals: "physical well-being" and "social approval." As a third candidate, he also mentioned "loss-avoidance." However, whether one accepts Lindenberg's assumptions about these ultimate goals of man or not is actually not important because they do not explain differences in individuals' actions.

[22] Ironically, against the critique of rational choice theorists that the homo sociologicus is conceptionalized only as a puppet of structure, one could reply that the homo economicus is only a puppet of structural change.

This leads us to the next question: What are the important constraints and possible alternative courses of actions?[23] Because these issues are exogenous to rational choice theory, this model must be silent in answering this question. Thus, rational choice theory logically presupposes macrotheory to identify the specific historical structures and processes which produce and change concrete opportunity sets for individuals' actions and, one should add, cut down the set of abstractly possible courses of action to a vastly smaller subset of feasible actions (Elster 1979) - making choices possible at all[24] (see Blau 1994). Blau is therefore right that Coleman's micro-macro transition needs to be reversed into a macro-micro transition to represent the correct causal nexus (Blau 1994:150).[25] To avoid ad hoc formulated "bridge assumptions" (Lindenberg 1990)[26] about concrete action situations, rational choice theory needs an explicit macrotheory.[27]

Let me demonstrate this point again using the above application example. The economic theory of the family (see Becker 1981) postulates that the general preference to marry is basically the same for all actors at all times and places, so that differences in observed marriage behavior after the occurrence of a pregnancy can only be explained by differences in the set of opportunities. But what are the concrete opportunities in this specific action situation? Using Becker's economic theory of the family, we simply don't know! This universal theory only states that the decision whether to marry at all when a pregnancy occurs is related to expectations of what will happen within marriage in the future: (1) what the expected gains are (i.e. the dependencies of partners' utilities on each other[28]) and (2) how they are going to be

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[23] In Lindenberg's (1985) terminology: What are the initial conditions?

[24] There is no choice without alternatives. In the rational choice theory, constraints are assumed to be not within the control of the agents. However, human actors always have the choice to change these alternatives. This causes Gambetta (1987) to argue that rational choice theory is more likely to ask which course of action an individual is likely to choose among those open to him, rather than how and when individuals will take action for changing the available alternatives.

[25] Of course, this controversy between Blau and Coleman only reflects a very static view of the world. As I will develop below, both perspectives are important simultaneously.

[26] In the case of empirical social research, it would be better to use the term "bridge hypotheses" instead of "bridge assumptions."

[27] This is because these assumptions cannot be deduced from the general rational choice model.

[28] In the economic theory of the family, altruism is particularly considered to be an important element in the functioning of families. It ties couples together even if only one of the partners is altruistic. They then all care about their joint income, and all try to maximize it, even the selfish family members. The mechanism that guarantees this is the compensatory behavior of transfers from altruists to others.

distributed (e.g. to which degree positive assortative mating is associated with complementarity[29]), and (3) what division of labor they rest on (e.g. the extent of sex-specific specialization in the household and market sector). Because real actors are normally not asked to give answers to these questions, it is easy to see that without additional (ad hoc) hypotheses about the various concrete gains of marriage, their actually possible distribution among the partners and the history-specific types of division of labor between the sexes, this "explanation" is necessarily empty in any empirical analysis. Thus, concrete history-specific hypotheses about the constellation of constraints (opportunities) are needed in any empirical application. Because rational choice theory does not generate them, the researcher is dependent on his/her ingenuity. Of course, this opens the door for ad hoc considerations.

In our concrete research example, the researcher therefore would have to "speculate" about the reasons for marriage today. For instance, he/she could contend that marriage provides the opportunity for long-run intimacy and emotional support, a companionship that, by involving historical continuity, promises memories of a shared past (Oppenheimer 1988). It also provides the opportunity for regular (and safer) sex, and so on. Most of these returns to marriage not only defy easy quantification, but, more important for our current example, these gains could also be obtained within long-term consensual unions.[30] Why is it then that many of these couples want marriage as a setting for having children? In economic terms, one could argue that in (West) Germany the tax system rewards non-work or part-time work of one parent and since not enough kindergartens, pre-primary schools and daycare institutions are provided in (West) Germany, one of the parents (the wife in particular) tends to interrupt her/his employment when the child is born, and to a large extent, only re-enters the labor market again after some lengthy period, if at all.[31] Thus, the concrete (economic) returns to marriage for such couples would be tax reduction and more security for the parent (the wife in particular) that leaves the labor market for some period. Another reason for men could be that in (West) Germany custody for the child

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Thus, as long as the altruists receive something, selfish family members behave altruistically both toward altruists and toward the altruists' other beneficiaries. This type of behavior makes it possible to define a family utility function based on the altruists' preferences, which everybody wants to maximize.

[29] This means to which degree there is a beneficial effect of one trait on the marginal contribution of the other.

[30] It is important to note here that most of the gains of marriage assumed by the economic theory of the family can also be realized in consensual unions of modern societies. In this sense, the economic theory of the family circumscribes a very traditional family system.

[31] Theoretically, husband or wife could interrupt their employment, but empirically it is still an exception that husbands stay at home (see Blossfeld, Drobnič and Rohwer 1995).

is only granted to the married father. However, if the partners get along very well with each other this could be of minor importance.

In summary, this example demonstrates three interesting points: (1) All of these reasons are somehow plausible motivations to get married; (2) they are not specifically suggested by rational choice theory; and (3), at least in my view, they are unlikely to be the reason for such an important and long-term life course decision as marriage.[32] Thus, rational choice protagonists' endeavor for universal theories comes at a high price: theorizing does not arise out of concrete empirical problems anymore and the suggested more specific hypotheses often become more or less arbitrary. However, it is exactly these specific hypotheses that are of particular interest in any empirical study. They help the researcher to understand the situation or to predict individuals' concrete actions, and they are the "variables" that typically have to be assessed through empirical research.

Criticizing Empiricist Studies

When rational choice proponents survey large-scale data studies, they normally focus on a very specific type of empirical research that is predominantly non-theoretical, methods-driven or simply empiricistic. For example, Esser (in this volume) attacks quantitative social research from the perspective that it only tries to "explain" the variance of a dependent variable by a set of independent variables.[33] True, there are many practitioners of quantitative sociology who are uncritically happy when associations are found, and the stronger the better.[34] However, there are just as many competent empirical social scientists who know that this narrow view is wrong and unproductive (see Goldthorpe and Ultee in this volume). They are aware of the fact that variance explained or high levels of goodness-of-fit statistics do not explain anything, only theory does.[35] However, in their attacks against non-theoretical and merely methods-driven kinds of empirical research, many rational choice protagonists tend to throw out the baby with the bathwater and disregard the great number of

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[32] For example, in Sweden, a country with a tax system that does not reward dual full-time marriages and offers better child-care provisions, it is still very common for cohabiting couples to marry in the advent of a first birth (see Hoem 1995:46).

[33] See also Coleman (1986) and Freedman (1991).

[34] See the excellent book by Lieberson (1985).

[35] Ironically, the introduction of newer approaches to data analysis - log-linear models, logit models, hazard rate models - decreased the danger that applicants will be mechanical with respect to "explained variance" because maximum likelihood estimation does not provide such a nice measure like R^2. Pseudo-R^2 measures are much less attractive because they depend on the number of observations and successive comparisons with likelihood ratio tests can only be relative (and in most cases hierarchical).

excellent and theoretically informed quantitative work, particularly in the newly developing field of longitudinal data analysis.

Caricaturing Social Stratification and Mobility Researchers to be Studying Variables Instead of Actors

Many proponents of rational choice theory have blamed social stratification and mobility researchers to be "variable sociologists"[36] (e.g. Esser in this volume) studying the relationships between variables instead of actors (e.g. Elster 1979; Coleman 1986; Boudon 1981; Abbott 1992). Technically speaking this is indeed true. Using the individual as the unit of analysis,[37] stratification researchers ask people about their characteristics, things they do, or things that have happened to them. These measurements are stored as variables and the relationship among them is then analyzed using statistical techniques. However, to contend that structural researchers conceptionally treat "variables rather than individuals as the units of analysis" (Boudon 1981; Esser in this volume) or even "variables as subjects that are doing the action" (e.g. Abbott 1992) is more than a caricature of a competing sociological approach. It also exaggerates (small) existing theoretical cleavages between structural approaches and the mainstream version of rational choice theory.

True, structural researchers theoretically focus on the constraints of individual actions rather than on individuals' intentions. They are particularly interested in situations where the actions of a great number of individuals are channeled by external constraints leaving not much room for the importance of individual choice. For example, mobility processes between social classes (e.g. Erikson and Goldthorpe 1992), educational opportunities of working class children (e.g. Shavit and Blossfeld 1993), mobility constraints for workers in various labor market segments (e.g., Blossfeld and Mayer 1988), wage differentials between men and women (e.g. Hannan, Schömann and Blossfeld 1990), gender-specific career opportunities (e.g. Blossfeld and Hakim forthcoming), structural constraints in the process of family formation (e.g. Blossfeld 1995) etc. In most such empirical applications structural sociologists do not deny choice. Rather they contend that structural constraints affect individual actions by determining the objective probabilities that their most preferred aim (e.g. better educational attainment, higher income, career advancement, better life etc.) can be realized. Thus, structural constraints make some desired aims easy for individuals to attain; they make other goals more difficult to attain and, in extreme cases, they preclude the attainment of specific ends altogether (Friedman and Hechter 1988). For example, the role of consensual unions was quite different in the former Federal Republic of Germany (FRG) and the German Democratic Republic (GDR) (see Blossfeld/Klijzing/Pohl/Rohwer 1995) because of different structural constraints. In the

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[36] In German the term is "Variablensoziologen" (see Esser in this volume).

[37] We neglect inequality studies based only on aggregated data because they are rarely used today. Most social structural and mobility studies are based on individual data.

GDR after the late 1970s there was a structural reason not to marry in the event of a child because these unmarried mothers had privileged access to daycare institutions, had longer paid maternity leaves, and had a better opportunity to stay at home and take care of sick children (Huinink 1994). Therefore, in the GDR more than 50% of first births took place out of wedlock in the late 1980s, whereas in the FRG, the respective figure was still below 10% at the end of the 1980s (Pohl et al. 1992). In addition, mothers who were enrolled in school received better daycare service for their children and privileged access to student's homes etc. And this explains why there is no significant effect of educational attainment and school enrollment on entry into marriage and motherhood for East Germany. In the GDR, a pregnancy was no danger for the school career, as has been the case for West Germany.

It is also true that in structural studies the assumptions about actors are often left implicit (Gambetta 1987). However, because structural sociologists normally accept, implicitly or explicitly, the rationality assumption ("people act reasonable") as well as the presumption that individuals strive for similar ends (e.g. better educational attainment, higher income, career advancement, better life etc.), they simply consider the intervening action orientation of individuals as fairly uninteresting compared to the impact of structural constraints. Thus, one could contend that their explanations only seem to be "incomplete" (e.g., as contended by Esser in this volume) because it would make little difference for our understanding of individuals' actions, if a structural explanation of possible courses of action were explicitly added to a highly sophisticated choice model or not.

To some extent, this discussion also shows that the distinction between an economist's (e.g. Stigler and Becker 1977)[38] explanation[39] on the one hand and the explanation of a structural sociologist on the other becomes obscure. In both approaches changing constraints are extremely important. However, in my view, the approach of the structural sociologist is theoretically superior because it does not consider the changes in the constraints as theoretically external or assumed to be given. Rather it tries to identify and conceptualize the relevant structural alternatives in an evolving social world.

Problems of Predicting Courses of Action

As summarized by Elster (1989a), rational choice theory conceives the actor as a decision-maker who successfully achieves three optimizing operations: "finding the best action, for given beliefs and desires; forming the best-grounded belief, for given evidence; and collecting the right amount of evidence, for given desires and prior beliefs" (Elster 1989a:4).

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[38] But also adopted by sociologists (see e.g. Lindenberg 1985).

[39] Assuming that only opportunity costs differ, so that "new tastes" could be derived from the change of specific constraints, given general human preferences.

Early rational choice models have not been very attractive for practitioners of empirical research because they suppressed most real-world complexities of the decision situation by unrealistic behavioral assumptions (see Goldthorpe and Ultee in this volume). In order to derive "elegant" models, scientists assumed that preferences and constraints are given and that the actors are fully informed about all possible courses of actions, and about their consequences as well as the likelihood of events. It can be shown that all sorts of behavior are consistent with or plausibly suggested by these types of choice models. However, not surprisingly, they have not been very successful in predicting peoples' behavior empirically.

Predictions of empirical courses of action might fail in such rational choice models because of two reasons: (1) people may act irrational and/or (2) the real-world situations in which people try to behave rationally are much more complex than assumed in the theoretical model.

Let me first discuss the case where people behave irrationally. In this case, individuals do not carry out the action that is best for their given beliefs and desires; they do not form the best-grounded beliefs for given evidence or do not collect the right amount of evidence for given desires and prior beliefs. Although irrationality is quite widespread, I will not discuss it any further here. The reason is that we are not interested in determining the actions of particular individuals but in explaining the general regularities which govern the actions of many people (see Goldthorpe in this volume). At this aggregated level however the rationality assumption plays a privileged role -- not only because most people normally want to be rational, but also because the prediction of the behavior of aggregates will most likely be successful if we assume that, by and large, people act rationally (Elster 1989a).[40] As Stinchcome (1968) has shown, the behavior of large aggregates can also be comprehended reasonably well, even when the individual components of the aggregates are poorly understood. Given this macro-level focus, small idiosyncratic deviations of individuals from the postulated rational model are not damaging for sociological predictions (Hedström forthcoming).[41] Aggregate intentions are also apt to be much more stable than individual intentions over time (Ajzen 1985). See, for example, the studies about the number of children women planned to have (Bumpass and Westoff 1969;; Westoff and Ryder 1977). They showed that at the individual level only 41% of the women had exactly the number of children they had planned. On the average, however, the women's actual family size (3.3 children) was found to correspond precisely to the intended family size (also 3.3 children) (Bumpass and Westoff 1969).

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[40] And even if we conclude that irrationality offers the best explanation of a given kind of group behavior, then most of the evidence about the agents that goes into that conclusion is formed on the assumption that they are, by and large, rational (Elster 1989a).

[41] Thus, rational choice explanations need not be derivable from postulates about psychological states of individuals. However, they must be compatible with optimizing assumptions about the intentions of individuals (Green and Shapiro 1994).

For empirical applications in sociology, it is more interesting to discuss prediction failures of rational choice theory because real-life situations are much less determinate than assumed in the restrictive theoretical models. Following Elster (1989a), such uncertainties can arise at three levels.

First, the actions of individuals may not be easily predictable because individuals are unable to compare and rank all possible courses of action. This problem is particularly severe when individuals know little about the alternatives themselves to make a rational decision. For example, it is hard for people to compare and rank rationally different future educational tracks, alternative job careers, differences in long-term marriages with various partners etc. because they simply do not know much about these alternatives in future. Thus, when decisions have to be made to prefer one future mode of life to another, more peripheral considerations often come to the fore to motivate a decision (Elster 1989a). In this sense, one could argue in our particular research example that couples living in consensual unions do know little about their concrete marital lives in future (Burkart 1994) so that they have to motivate their marriage decisions by more "peripheral reasons" like tax reduction and more security for the wife that leaves the labor market for some period. But there is not only the question of whether to marry. Equally important is an answer to the question of when the right time for marriage is. If future possible alternatives (with other marriage partners) are not yet known, there is also the problem of when to make the optimal decision with regard to these (still unknown) alternatives. There is always an incentive to postpone a marriage decision because other possible marriage partners might be more attractive, but postponing marriage forever clearly might not be optimal for an individual who would like to marry. On the other hand, there is also the danger that the current possible marriage partnre opts for another partner making it attractive to marry earlier. Thus, in many situations people have to introduce a mechanism that triggers off a decision at a specific point in time. For example, couples ready for marriage could decide not to use contraceptives anymore and simply wait to see what happens. The "chance event" of a pregnancy could then be used as a motivation to determine the concrete timing of entry into marriage.

Second, the behavior of actors may be hard to predict, as there could be uncertainties with regard to their beliefs. This means that individuals are not able to reliably assign probabilities of possible results of their future courses of action. With respect to the previously mentioned research example, men and women living in consensual unions will have problems in predicting the future gains of marriage, how they will be distributed amongst them and what division of labor they will rest on. Under such uncertainties, rational choice theory is quite limited. As noted by Elster (1989a), this problem is particularly severe when a decision requires beliefs about choices to be made by other people in future, as is the case in our research example where each prospective marriage partner must have long-term beliefs about the future choices to be made by the respective other one.

Finally, problems arise with regard to the optimal amount of information one should collect before forming an opinion. Collecting information is necessary, but costly and time- consuming. Unfortunately, it is often not possible to estimate probable marginal costs and benefits for further information searches. Therefore, actors sometimes set

certain tolerance limits for themselves which, when satisfied, stop the search for additional information (Simon 1954, Esser 1991). Thus, in our example, cohabitation could be interpreted as a temporary trial period before marriage (Manting 1994). The problem of each partner is to then decide how long he/she should further collect information about the respective other person in daily life situations until a reasonable marriage decision can be made.[42] Also in this case, the event of a pregnancy can help the couples to stop further information searches about each other and push them to make up their minds.

In summary, in many empirical applications of large-scale data analysis rational choice theory can be attacked as a quite powerless theory when one wants to derive unambiguous predictions because of the absence of well-defined sets of alternatives and their consequences, information processing limitations in computing optima from known preference and utility information or unreliable probability informations. Thus, in my view, the usefulness of rational choice theory for typical empirical applications in macro sociology is crucially dependent on the extent to which this approach is able to incorporate various forms of unresolved value conflicts and the consequences of uncertainty.

Heiner (1983), for example, argues that the limits to maximizing actually become the origin of predictable behavior. He suggests that the observed regularities of actions should be understood as "behavioral rules" that arise because of uncertainty in distinguishing preferred from less-preferred behavior. Uncertainty requires actions to be governed by mechanisms that restrict the flexibility to choose potential courses of actions, or which produce a selective alertness to information that might prompt particular courses of actions to be chosen. These mechanisms will simplify behavior to less-complex patterns, which are easier to recognize and to predict (by the actors themselves and, of course, by the social scientist!). According to Heiner (1983), predictable behavior will evolve to the extent that uncertainty prevents agents from successfully maximizing. Greater uncertainty will cause behavioral rules to be more restrictive in eliminating particular actions or response patterns to potential information. Heiner (1983) interprets social institutions or social norms as such rule-mechanisms for dealing with recurrent situations faced by individuals (see also Lindenberg 1983; Esser 1991; Lukes 1991).[43] They enable each actor (and the social researcher!) in modern societies to know less and less about the behavior of the other individuals and about the complex interdependence generated by their interaction.

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[42] Interestingly, many empirical studies on the role of cohabitation in the divorce process show that people who have cohabited before marriage have much lower marital stability than couples who did not cohabit before marriage (Hoem and Hoem 1988; Bumpass and Sweet 1989; Schoen 1992; Klijzing 1992; Manting 1994). This suggests a self-selection process, in which couples with a high dissolution rate select themselves into consensual unions before marriage.

[43] See also the work on "habits" and "framing" (e.g. Lindenberg 1990; Esser 1990).

Another way to reduce choice complexity under uncertainty is that individuals attempt to constrain or bind the flexibility of their own future actions (Elster 1979). This line of argument offers a more general explanation for the marriage decision in our research example. It could be developed round the idea that having children is an irreversible, long-term, joint project that constrains the behavior of both partners (and that of the woman in particular). On the one hand, a child decreases the chances of finding a new potential partner for both women and for men. There is a greater need for stability for both partners because later possible matches may not be as desirable as the current one. This risk is probably greater for women, given their tendency to be responsible for children (Oppenheimer 1988; Blossfeld, Manting, and Rohwer 1993). In addition, if quality of children (Becker 1981) is an important desire of individuals, then this dramatically will constrain the future behavior of both partners. A major difficulty of making this joint long-term project a successful one, however, lies in forecasting the own future behavior and the future behavior of the cohabiting partner on the basis of the incomplete information currently available. This suggests that the decision to marry depends partly on how well the individuals can predict their own and their partner's future lives. One rational way of making oneself act in favor of the joint long-term project in future is to induce a belief from which that course of action will follow compellingly (Elster 1979). From this point of view, marriage could be seen as a precommitment to bind oneself at present in order to increase the probability that one will carry out a certain (honorable or responsible) behavior with regard to the child and the partner in the future. As noted by Elster (1979), the crucial point here is that the expected change in the probability of the later course of action is the motive for marriage -- not an unintended effect, nor a predictable and not unwelcome effect. Marriage as a means of precommitment is also a natural technique for lending credibility to promises for the partner (Elster 1979). Thus, it might be individually rational to follow the norm "If the woman gets pregnant, then marry" because it lends credibility to promises that otherwise would be less believable. Hence, an important condition for predictable behavior is making credible communications about what one will do under future circumstances.[44] These credible promises enable the partners to cooperate more than they would have otherwise done. There can be three reasons why unmarried partners are expected to behave more honorably when they are married under unforseen circumstances in the future: (1) Marriage instead of cohabitation is not considered to be a trial period;[45] (2) marriage compared to cohabitation has a

[44] It goes without saying that the partners are free to bind themselves through a marriage contract to protect their "deeper" values against their more impulsive ones (see Elster).

[45] There is plenty of empirical evidence that the period of cohabitation in modern societies is still dominated by a "weeding process" (Klijzing 1992).

much higher level of stability,[46] and (3) the dissolution of a marital contract involves much higher transaction costs than the dissolution of a consensual union.[47]

Neglecting the Dynamics of Historical Processes

Although the framework of rational choice theory is inherently dynamic (Lindenberg 1985),[48] most of its proponents have not really taken the time-relatedness of social processes seriously. Rather they prefer logical reconstructions of "time-less" action situations (see, e.g. Esser 1991). This is because much rational choice scholarship is (very often implicitly) an equilibrium analysis under static conditions (Green and Shapiro 1994; Ultee in this volume).[49] It is simply assumed that such choice situations can be arbitrarily abstracted from a continuous social process, involving two unproblematic sets of factors: preferences and (perceived) action opportunities (Hedström forthcoming).[50] The problem of this "ahistorical approach" is the implicit assumption that subsections of the social process have clear beginnings, middles, and ends.[51] But this does not hold for entities such as societies. For them, as noted by Abbott (1992), there is only an endless middle. Societies consist of a continuous stream of historical events and sets of situational consequences flowing from those events. Thus, when we conduct an empirical study, the historical process is always ongoing and this poses difficult theoretical and empirical specification problems with

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[46] All studies show that marriages have a much higher level of stability (e.g. Klijzing 1992; Hoem 1995).

[47] Based on this analysis, one could offer a speculative argument about the changing significance of marriage as a credible promise: If cohabitation loses its meaning as a trial period, changes its character with increasing stability, or if the costs of divorce are reduced, then this will tend to erode the chances of making a credible promise by the act of marriage and lead to fewer marriages in the case of pregnancies in consensual unions.

[48] For example, Becker's (1975, 1981) theory of human capital and his economic theory of the family, or more dynamic game theoretical considerations with several iterations.

[49] Sometimes also a comparative-static analysis is used, where it is assumed that the direction on which an equilibrium is expected to move in response to exogenous changes in ends, beliefs, or environmental constraints is known.

[50] It is not by chance that many rational choice theorists assume preferences and constraints simply as given. In this conception only the future counts and the past does not seem to be important.

[51] In rational choice theory, this assumption also applies to subsections of the individual life course.

regard to the preferences and constraints at any point in time.[52] Of course, as discussed above, many rational choice scholars simply assume preferences and constraints as unproblematically given, and they unrealistically pretend that social processes are in equilibria or, at least, always move swiftly towards them after an external upheaval is introduced (see Ultee in this volume).[53] However, after more than 20 years of empirical life course and cohort research, these assumptions seem to me more than peculiar and outdated.

Thus, when we study the dynamics of action situations both empirically and theoretically, we should instead start with the idea that we artificially open an observation window with regard to an already continuously flowing stream of social history. It is therefore impossible to empirically study the social process from scratch; this should be recognized and also reflected in analytical terms.[54] There is always a previous history before any history. Therefore, two questions become important: (1) How can we conceptualize and measure the genesis of individuals' preferences and the sccial constraints to which people are exposed up to the point in time when we begin to study an action situation? and (2) How do preferences and constraints develop over time within an (empirical or conceived) observation window?

The first question is of crucial importance because most sociological research must be based on non-experimental observations of social processes, and these processes are highly selective and historically specific (Lieberson 1985). One of the important contributions of life course studies has been to make macrosociology more sensitive towards these issues. This research focuses on peoples' life courses because at least these entities have a clear beginning, middle and end in the flow of history.[55] In particular, these studies demonstrated in many empirical analyses that the following considerations are important for our understanding of the social process (e.g., Blossfeld 1989, 1995; Mayer and Tuma 1990; Huinink 1993): (1) Life courses are highly time-related, selective, and cumulative processes that are molded by history-specific institutions and culture as well as by purposive individuals; (2) life courses always emerge and change under particular historical conditions that have to be carefully considered (period effect); (3) in modern societies, successive generations

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[52] In event history analysis this methodological problem is called "left censoring" (Blossfeld and Rohwer 1995).

[53] The equilibrium assumptions in economics and sociology have often taken attention away from a serious interest in processes of change in the social system (Tuma and Hannan 1984).

[54] It is indeed interesting to see how sociologists and rational choice proponents in particular have theorized about the question of how social order is possible at all. Most of them seem to believe that it would be possible and meaningful to develop an analytical model that restarts the social process from scratch.

[55] Making the theoretical and empirical specification of constraints and preferences less vulnerable.

start and experience their life courses in very different historical settings and therefore differ markedly (cohort effect); (4) individuals are affected by various parallel processes at different levels (i.e., there are multiple clocks and point-in-time events at the micro, intermediate and macro level); (5) not only the type of event (e.g. pregnancy) but also its timing is of importance for the courses of action (e.g. marriage); and (6) time-dependencies in specific states can be interpreted as expressions of dynamic causal processes or diffusion processes[56].

The second question of how preferences and constraints develop within an observation window is equally important because the processes just mentioned do not come to a halt at the beginning of an observation window. Individuals' actions must therefore be studied from the perspective that they interact with these processes over time. Thus, the interdependencies of individuals' social actions and structural processes at different levels have to be reconstructed.

Let's demonstrate this aspect again based on our example where the woman gets pregnant in a consensual union. With regard to the marriage decision, it seems to be important to distinguish two completely different situations at the time of the discovery of the pregnancy: (1) the preferences of the partners to marry are vague and diffuse; and (2) the couple already has had reached a decision to marry or not to marry in the case of child.

Diffuse marriage preferences and the negotiation process: For many couples in modern societies, the preferences towards marriage might be quite vague and diffuse at the beginning of the pregnancy, so that through the occurrence of a pregnancy a process of preference formation and persuasion might be initiated (Elster 1989c). Formation means that initially relatively vague preferences with regard to marriage are formed, resulting in more clear-cut preferences in a step-wise negotiation process. Persuasion means that an individual is led by a sequence of short-term improvements into preferring marriage over non-marriage, even if he/she initially vaguely preferred non-marriage over marriage.[57] In such cases, the discovery of a pregnancy engenders a process of change in preferences. This process of preference formation and persuasion will be very time-structured due to two reasons. On the one hand, the opportunity to legalize the birth of the child tends to decrease with the duration of pregnancy. At the same time the likelihood of possible medical complications (premature birth, be laid up with health problems, etc.) connected with the pregnancy and the visibility of pregnancy to other people increases. Hence, the optimal time for marriage, in the sense of the smallest risk of medical complications connected with the pregnancy and the visibility of the pregnancy to other people, is at a relatively early pregnancy phase. On the other hand, the optimum in the sense of a safe, well-thought through decision based on a negotiation process between the partners is often at a

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[56] Based on the idea that some sort of "contagion", "infection", "imitation", "conformity", "bandwagon", "norm effects", or simply social pressure drives the process under study (see Blossfeld and Rohwer 1995; Manski 1995).

[57] Or the other way around.

relatively later phase of the pregnancy.[58] Thus, there is a constant tension between these often opposing forces in the attempt to optimize the marriage timing, a tension that may often but not necessarily be connected with a considerable shift in preferences with regard to marriage. Based on these contradictory forces on the marriage decision process, one would expect that the rate of entry into marriage after the discovery of pregnancy at first increases with the duration of pregnancy and then, after reaching some maximum, decreases again as the time of birth comes closer. Of course, shortly before and after the birth, one would expect a very low marriage rate. Finally, after the birth has already taken place out of wedlock, the decision of whether or not to marry has a different quality. The child is then already "illegitimate", and the time pressure to marry has disappeared.[59] Thus, one has to again expect a relative low marriage rate some time after the birth of the child. The results of the empirical analysis of Blossfeld, Klijzing, Pohl and Rohwer (1995) show that after having controlled for several important covariates, West German women do indeed seem to follow this pattern with respect to the rate of entry into marriage. This interpretation of the time-dependence within the observation window is derived from a theoretically supposed underlying negotiation process model at the level of the non-marital couples, leading to a formation and perhaps a change in initially still unstructured preferences for marriage.[60]

Marriage decisions and the observed rate of entry into marriage: Of course, one could also argue that many couples had already decided to marry or not to marry when the pregnancy was first discovered. Thus, couples would in fact be extremely heterogeneous with regard to their baseline rate to enter into marriage when the pregnancy is observed. For example, if the consensual union population consists of two groups - one with a constantly low marriage rate[61] and the other with an increasing rate as pregnancy progresses[62] - this neglected (or unobserved) heterogeneity will then

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[58] It is very likely that after some time, there is a cut-off point where calculation stops and the partners simply have to make a still unsupported choice. This point might just as well be as close to the childbirth as possible.

[59] One could argue that the next important date that exerts pressure to reconsider the marriage decision is new pregnancy or the time of entry into school.

[60] The time-dependent dummy variables in the study of Blossfeld, Klijzing, Pohl and Rohwer (1995) therefore served as proxies for a theoretically important process that is hard (or even impossible) to measure.

[61] Only in extreme cases would one expect a marriage rate of zero.

[62] For couples who have already reached a decision to marry in the event of pregnancy there is the additional pressure to really go through with it due to the increasing risks of medical complications connected with the pregnancy (e.g. premature births) and the visibility of the pregnancy to other people. This will, of course, lead to an increasing marriage rate with the progression of pregnancy.

result in a bell-shaped marriage rate in the observation window, too (Blossfeld and Rohwer 1995). This is because at the progression of pregnancy, the composition[63] of the unmarried couples shifts towards couples being "less ready for marriage" or being "not ready for marriage" which, at first, increases and then decreases the observed rate pattern.[64]

To be able to examine these theoretical interpretations, one would need in addition to the usual available "objective" data about facts and events (i.e. the dates of entry into pregnancy and marriage), time-related information about partners' beliefs with regard to their possible future marriages and their expected outcomes, the information these actors actually take into account in making decisions, and the results of these decisions themselves (see, e.g. Liefbroer and De Jong-Gierveld 1993) [65]. Thus, for studies aiming to model individuals' choices and behavior over time, panel observations of beliefs, expectations and available information states, combined with retrospective information on behavioral events since the last sweep, appear to be a very desirable design (Blossfeld and Rohwer 1995).

3. A Dynamic Integration of Micro- and Macro-Perspectives

In this section, I want to develop a more systematic sketch of how causal relations suggested by a dynamic combination of macro and micro theories can be represented in event history models and then be better examined with temporal data.

Max Weber's Pioneering Work

The epistemological justification for a combination of micro- and macro-level approaches rests on Max Weber's ideas that complete sociological explanations have

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[63] See also DeGraf, Nieuwbeerta and Heath (1995) for a similar discussion with respect to voting behavior.

[64] Thus, if we do not know whether the couples have already reached a decision to marry in the case of a child at the time of pregnancy, we are not able to say whether the effects of the dummy variables must be considered as proxies for the formation of couples' decisions during pregnancy or for the heterogeneity of couples' marriage decisions at the beginning of pregnancy. Obviously, both interpretations may be valid in reality. However, the important conclusion is that the discovery of a pregnancy leads to a changing marriage rate for most couples within the observation window.

[65] It is very important to also record the timing of decisions. For example, it could happen that a couple first decides to marry; then, following this decision, the woman becomes pregnant, and finally the couple marries. In this case, we would observe pregnancy occurring before marriage and assume that pregnancy increases the likelihood of marriage. However, the time order between the events is exactly the other way around: the couple decides to marry and then the woman gets pregnant.

to combine two different methods[66]: Erklären (the establishment of statistical associations between observable events[67]) and Verstehen (the theoretical specification of relationships between observable events, typical actors' intentions and their purposive actions). Consequently, successful sociological explanations must rely on both, on empirical correlations between events and causal mechanisms helping us to understand why people in specific situations act in a typical way producing a statistical relationship (Elster 1989c; Stinchcombe 1991; Kiser and Hechter 1991; Hedström and Swedberg 1995 and in this volume).

Sociological explanations can therefore fail in two respects: (1) If we are not in a position to say something about the frequency (or probability) of a specific type of situation and its outcomes, then we cannot assess the sociological relevance or explanatory power of a supposed causal mechanism, regardless of how well we theoretically understand a particular situation;[68] and (2) if we are not able to specify a theoretical mechanism, then we cannot understand the sociological meaning of an observed covariation between variables, independently of how strong this association may be.[69] Of course, to avoid pure storytelling (Hedström forthcoming)[70], a causal

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[66] "Kausale Erklärung bedeutet also die Feststellung: daß nach einer irgendwie abschätzbaren, im - seltenen - Idealfall: zahlenmäßig angebbare, Wahrscheinlichkeitsregel auf einen bestimmten beobachteten (inneren oder äußeren) Vorgang ein bestimmter anderer Vorgang folgt... Eine richtige kausale Deutung eines konkreten Handelns bedeutet: daß der äußere Ablauf und das Motiv zutreffend und zugleich in ihrem Zusammenhang sinnhaft verständlich erkannt sind. Eine richtige kausale Deutung typischen Handelns ... bedeutet: daß der als typisch behauptete Hergang sowohl (in irgendeinem Grade) sinnadäquat erscheint wie (in irgendeinem Grade) als kausal adäquat festgestellt werden kann. Fehlt die Sinnadäquanz, dann liegt selbst bei größter und zahlenmäßig in ihrer Wahrscheinlichkeit präzis angebbarer Regelmäßigkeit des Ablaufs ... nur eine unverstehbare ... statistische Wahrscheinlichkeit vor. Andererseits bedeutet für die Tragweite soziologischer Erkenntnisse selbst die evidenteste Sinnadäquanz nur in dem Maß eine richtige kausale Aussage, als der Beweis für das Bestehen einer (irgendwie angebbaren) Chance erbracht wird, daß das Handeln den sinnadäquat erscheinenden Verlauf tatsächlich mit angebbarer Häufigkeit oder Annäherung (durchschnittlich oder im 'reinen' Fall) zu nehmen pflegt." (Weber 1972:5-6).

[67] Of course, this association should not be spurious.

[68] Rational choice theorists often start their explanations at the individual level, and they do not pay any attention as to whether these situations actually recur in approximately the same form. Thus, they may understand the situation but simply fail to establish the sociological importance of their models.

[69] Very often sociologists using cross-sectional data and sophisticated methods of data analysis (like regression equations, path analyses, and structural equation models), only seek to "explain" the variation in the dependent variable (e.g. the

mechanism cannot be an ad hoc-interpretation or simply an ideographic account; and, as discussed above, to evade substantive emptiness, it can also not be a universal, "time-less" law (Elster 1989c).[71] Rather sociological mechanisms should be considered as elementary theoretical building blocks of limited generality tailored for a specific range of historical situations.[72] Thus, the term causal is not used here in the traditional meaning with regard to universal, "time-less" laws. It is based on systematic temporal variations and patterned regularities that themselves are a legitimate focus of our sociological understanding. This important difference will be made clearer below. The function of macro-level theories is to assist us in identifying the relevant structural events (or variables);[73] the task of micro-level theories is to help us to explain why there is a relationship between them.[74]

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proportion of variance explained). Thus, these sociologists establish the generality of a pattern but are unable to understand the relationship.

[70] I believe that all sociological explanations somehow have a character of storytelling.

[71] Several proponents of rational choice theory emphasize the importance of nomological laws in sociology (e.g. the works of Esser and Lindenberg). For example, they postulate that actors perceive courses of action and choose the action that maximizes (optimizes) their expected utility. However, as discussed above, for an empirical analysis of a concrete action situation this theory is empty because it is silent with regard to the concrete courses of perceived actions, their various utilities and the subjective probabilities attached to them (Kelle and Lüdemann 1995).

[72] The advancement of sociology could then be seen in a growing body of "knowledge of ever-more mechanisms rather than ever-better theories" (Elster 1989c).

[73] For example, macro theories may point our attention to specific processes like educational expansion, changes in the occupational, job or class structure, restructuring processes in the labor market, changing rates of unemployment, modernization processes, trends in the household structure or the dynamics of family types.

[74] For example, the rational actor model may be used to represent the principles guiding the actors' behavior in responding to macro trends and changes (Hedström forthcoming). It may help us to understand how a specific combination of individual desires, beliefs, and changes in action opportunities generate a specific action (Hedström and Swedberg 1995 and in this volume).

The Dynamics of Observed and Unobserved Processes

In my view, many of the fruitless debates and misunderstandings with regard to the relationship of macro- and micro-level[75] issues are due to the fact that sociologists often use "time-less" analytical terms and construct "time-less" theoretical models. But only if we take the time dimension more seriously, is it possible to recognize that in the dynamic interplay of structural events and individuals' choices, there is always an "earlier" and "later" that has to be defined in terms of past, present, and future (Prior 1967). "Time-less" theoretical thinking[76] neglecting the timing in the relationships necessarily will produce aporias, paradoxical problems, and belief controversies among scientists. For example, the debate of what is more important for a sociologist, institutional embeddedness or individual action (e.g. Lindenberg 1995; Coleman 1990; Blau 1994), is obviously an unnecessary question, as is the one about whether individuals' preference change engenders change in the social structure, or whether structural change leads to changing preferences. There can be no doubt that both aspects are important: institutional embeddedness and individual action, individual preferences and social structure - but there is always a time order of events in this relationship. For example, the claim that explaining behavior by reference to different preferences would be tautological (see Friedman and Hechter 1988) is, of course, only true in a time-less conception where preferences are equated with behavior.[77] However, when the dynamics of preferences and behavior respectively are measured over time, then this is not the case anymore. Actually, it seems to me that this is the only fruitful approach to empirically test propositions derived from rational choice models. Thus, we have to strive for reliable and valid time-related measures of the unobserved entities like tastes, beliefs, decision rules etc. (see Green and Shapiro 1994).[78] In particular, we must collect data on rational expectations predictions of individuals' future behavior.[79]

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[75] Blau (1994) correctly stresses that simplistic conceptions of only two levels may be highly misleading. Complex social structures normally consist of multiple levels of structure.

[76] Normally nurtured by the inferential limitations of cross-sectional data analysis (see Blossfeld and Rohwer 1995).

[77] It is interesting that rational choice proponents and economists in particular (see Manski 1995) often question the validity of measures other than behavior - actual choices - as indicators of preferences, tastes and beliefs (see Green and Shapiro 1994).

[78] Of course, this is a Pandora's box that cannot be adequately discussed in this paper (see, e.g. Ajzen and Fishbein 1980; Ajzen and Madden 1986; Ajzen 1989; Henerson, Morris and Fitz-Gibbon 1988; Manski 1995).

[79] These are respondents' best predictions of their behavior including information about (1) the awareness of the respondents about the actual process determining their future behavior and (2) the knowledge they possess at the the respective point

The Dynamics of Parallel Processes at Different Levels.

To make progress in the understanding of the dynamics of social action, we have to develop a sociological perspective that stresses such changes (or events) and their historical context. Actors should be conceptualized as individuals who intentionally decide between discrete courses of action, and these decisions and their possibly later following actions can occur at any point in time. If the dependent variable is discrete, like the outcomes of choices, and can change its state at any time, then a transition rate framework offers a time-point-related representation for causal effects (Blossfeld and Rohwer 1995).

A continuous time path of discrete intentional actions (or events) of an individual in one domain of life might be called a process. This process is normally embedded in a complex system of other parallel processes. These can operate at different levels. For example:

1. there can be parallel processes at the level of the individual in different domains of life (e.g. one may ask how upward and downward moves in an individual's job career influence his/her intentional actions in the family), cf. e.g. Blossfeld and Huinink (1991), and Blossfeld (1995);

2. there may be parallel processes at the level of some few individuals interacting with each other (e.g. one might study the effect of the careers of the husband on his wife's purposive participation in the labor force), see for instance, Bernasco (1994), Blossfeld, Drobnič and Rohwer (1995);

3. there may be parallel processes at the intermediate level (e.g. one can analyze how changing household structure determines women's intentional participation in the work force), see as an example, Blossfeld and Hakim (forthcoming);

4. there may be parallel processes at the macro level (e.g. one may be interested in the effect of changes in the business cycle on individuals choices with regard to family formation), see Blossfeld and Huinink (1991);

5. there may be any combination of processes type (1) to (4). For example, in the study of life-course, cohort and period effects, time-dependent covariates at different levels must be included simultaneously (Blossfeld 1986; Mayer and Huinink 1990). Such an analysis combines processes at the individual level (life-course change) with two kinds of processes at the macro level: (1) variations in structural conditions across successive (birth, marriage, etc.) cohorts, and (2) changes in particular historical conditions affecting all cohorts in the same way.

In event history analysis, time-dependent covariates have been used to include the sample path of parallel processes in transition rate models. In the literature however

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in time (Manski 1995).

only two types of time-dependent covariates have been described as not being subject to reverse causation (see e.g. Kalbfleisch and Prentice 1980; Tuma and Hannan 1984; Blossfeld, Hamerle, and Mayer 1989; Yamaguchi 1991; Courgeau and Lelièvre 1992):

1. Defined time-dependent covariates whose total time path (or functional from of change over time) is determined in advance in the same way for all subjects under study. For example, process time like age or duration in a state (e.g. duration of marriage in divorce studies), is a defined time-dependent covariate because its values are predetermined for all the subjects. Thus, by definition, the values of these time-dependent covariates cannot be affected by the dependent process under study.

2. Ancillary time-dependent covariates whose time path is the output of a stochastic process that is external to the units under study.[80] Again, by definition, the values of these time-dependent covariates cannot be influenced by the individual actor themselves. Examples of time-dependent covariates that are approximately external in the analysis of individual life courses are variables that reflect changes at the macro level of society (unemployment rates, occupational structure, etc.) or the population level (composition of the population in terms of age, sex, race, etc.), provided that the contribution of each actor is small and does not really affect the structure in the population (Yamaguchi 1991).[81]

In contrast to defined or ancillary time-dependent covariates, internal time-dependent covariates have been referred to as being problematic for causal analysis of social processes (e.g. Kalbfleisch and Prentice 1980; Tuma and Hannan 1984; Blossfeld, Hamerle, and Mayer 1989; Yamaguchi 1991; Courgeau and Lelièvre 1992). An internal time-dependent covariate Y_t^B describes a stochastic process, considered in a causal model as being the cause, that is in turn affected by another stochastic process Y_t^A, considered in the causal model as being the effect. Thus, there are direct effects in which the processes autonomously affect each other (Y_t^B affects Y_t^A and Y_t^A affects Y_t^B), and there are "feedback" effects, in which these processes are affected by themselves via the respective other process (Y_t^B affects Y_t^B via Y_t^A and Y_t^A affects Y_t^A via Y_t^B). In other words, such processes are interdependent and form what has been called a dynamic system (Tuma and Hannan 1984). Interdependence is typical at the individual level for processes in different domains of life and at the level of few individuals interacting with each other (e.g. strategic or game-theoretic actions in the case of career trajectories of partners; see, e.g., Elster 1979). For example, the empirical literature suggests that the employment trajectory of an individual is influenced by his/her marital history and marital history is dependent on the employment trajectory.

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[80] In Elster's (1979) terminology, this is parametric rationality or parametric action.

[81] For example, consider the changes in the occupational structure. While a job move by an individual might contribute to the change in the occupational structure, its effect on the job structure is negligibly small.

Blossfeld and Rohwer (1995) have proposed a causal approach to interdependent systems that provides a straightforward solution to (1) the simultaneity problem of interdependent processes, (2) the identification of lags between causes and their effects, (3) the study of temporal shapes of effects, and (4) the dynamic integration of macro and micro perspectives. I will outline this approach in more detail in the following.

Causes and Time-Dependent Covariates

In an influential paper, Holland (1986) developed the idea that causal statements imply counterfactual reasoning: If the cause had been different, there would have been another outcome, at least with a certain probability. However, the consequences of conditions that could be different from their actual state are obviously not empirically observable.[82] This means that it is simply impossible to observe the effect that would have happened on the same unit of analysis, if it were exposed to another condition at the same time.

Because causal relationships are inherently time-related connections, Blossfeld and Rohwer (1995) suggested to look in empirical applications at conditions which actually do change in time.[83] For example, a time-constant variable "gender" should ideally be replaced in an empirical analysis by time-changing events assumed to produce sex-specific differences in the life history of men and women. Of course, in empirical research that is not always possible, so that very often one must rely on time-constant "variables" as well. However, it is important to recognize that for these variables the implied longitudinal causal relation is not examined. For example, if we observe an association among people with different levels of educational attainment and their job opportunities, then we can normally draw the conclusion that changes in job opportunities are a result of changes in educational attainment level. The implied idea is the following: If we started having people with the lowest educational attainment level and followed them over the life course, they would presumably differ in their rates to attaining higher levels of educational attainment and this would produce changes in job opportunities. Whether this would be the case for each individual is not very clear from a study based on people with different levels of educational attainment. In particular, one would expect that the causal relationship (or causal mechanism) between education and job opportunities would radically be altered if all people acquired a higher (or the highest) level of educational attainment. Thus, the two statements - the first about associations across different members of a population and the second about dependencies in the life course for each individual member of the population - are quite different; one type of statement can be empirically true while the other can be empirically false. Therefore, statements of the first type cannot be regarded as substitutes for statements of the second type. However, since all causal propositions have consequences for longitudinal change (see Lieberson 1985), only

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[82] Holland (1986) calls this "the fundamental problem of causal inference."

[83] These changes can occur in discrete and continuous types of processes.

time-changing variables provide a more convincing empirical evidence of causal relations.

These changes are events. More formally, an event is a change in a qualitative or quantitative variable, and this change must happen at a specific point in time. The most obvious empirical representation of causes is therefore in terms of variables that can change their states over time. In event history analysis, this statement is linked very naturally with the concept of time-dependent covariates. The role of a time-dependent covariate in this approach is to indicate that a (qualitative or metric, direct or indirect observable) causal factor has changed its state at a specific time and that the unit under study is exposed to another causal condition.

Form this point of view, it seems somewhat misleading to regard processes or states of processes as causes. Instead, only events, or changes in a state variable, can sensibly be viewed as possible causes.

Time and Causal Effects

Consequently, we would not say that a process Y_t^A is a cause of a process Y_t^B, but that a change in Y_t^A could be a cause (or provide a new condition) of a change in Y_t^B. Or more formally:

$$\Delta Y_t^A \rightarrow \Delta Y_{t'}^B \qquad t < t'$$

meaning that a change in process Y_t^A at time t is a cause of a change in variable $Y_{t'}^B$ at a later point in time, t'. It is not implied, of course, that Y_t^A is the only cause which might affect $Y_{t'}^B$. So we should speak of causal conditions to stress that there might be, and normally is, a quite complex set of causes. A change in variable Y_t^A is therefore always measured relative to other causes. As noted by Marini and Singer (1988), a conjunctive plurality of causes occurs if various factors must be jointly present to produce an effect. A disjunctive plurality of causes, on the other hand, occurs if the effect is produced by each of several factors alone, and the joint occurrence of two or more factors does not alter the effect.[84] These considerations are important because in my view they provide the main reason for a time-dependence of causal mechanisms in sociology. They are always relative to a history-specific constellation of other causes. A causal mechanism may change or even disappear in the course of history because of changes in the setting of other important causes. Thus, if causal mechanisms are studied empirically, they must intrinsically be related to historical time. There are several further important aspects.

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[84] See the extensive discussion by Marini and Singer (1988).

Time Axis and Events

First, to speak of a change in variables necessarily implies reference to a time axis. We need at least two points in time to observe that a variable has changed its value. Of course, at least approximately, we can say that a variable has changed its value at a specific point in time.[85] Therefore, we use symbols to refer to changes in the values of the time-dependent variable ΔY_t^A and the state variable ΔY_t^B at time t. This leads to the important point that causal statements relate changes in two (or more) variables.

Time Order, Time Intervals, and Apparent Simultaneity

Second, there is a time ordering between causes and effects. The cause must precede the effect in time: $t < t'$, in the formal representation given above. This seems to be generally accepted.[86] As an implication, there must be a temporal interval between the change in the variable representing a cause, and the change in the variable representing a corresponding effect. Thus, the role of time in causal explanations does not only lie in specifying a temporal order in which the effect follows the cause in time. It additionally implies that a temporal interval is necessary for the cause to have an impact (Kelly and McGrath 1988). It takes some finite amount of time for the cause to produce the effect. The time interval may be very short or very long, but can never be zero or infinity (Kelly and McGrath 1988). In other words, there can never be a simultaneity of cause and its effect.

Some effects take place almost instantaneously. For example, if the effect occurs at microsecond intervals, then the process must be observed in these small time units to uncover causal relations. However, some effects may occur in a time interval too small to be measured by any given methods, so that cause and effect seem to occur at the same point in time. Apparent simultaneity is often the case in those social science applications where basic observation intervals are relatively crude (e.g. days, months, or even years), such as, for example, yearly data about first marriage and first childbirth (Blossfeld, Manting, and Rohwer 1993). Other effects need a long time until they start to occur. Thus, there is a delay or lag between cause and effect that must be specified in an appropriate causal analysis. Unfortunately, in most of the current

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[85] Statements like this implicitly refer to some specification of "point in time." The meaning normally depends on the kind of events which are to be described, for instance, a marriage, the birth of a child, or becoming unemployed. In event history text books, a continuous time axis for purposes of mathematical modeling is normally assumed (see Blossfeld and Rohwer 1995). This should however be understood as an idealized way of representing social time. Here we are using mathematical concepts to speak about social reality, so we will disregard the dispute about whether time is "continuous" (in the mathematical sense of this word), or not (see also Abbott 1992).

[86] See, for instance, the discussion in Eells (1991, Ch.,5).

rational choice theories and interpretations of research findings this interval is left unspecified.

Temporal Shapes of the Unfolding Effect

This immediately leads to a third point. There might be different shapes of how the causal effect Y_t unfolds over time. While the problem of time-lags is somehow recognized in the literature on methods in sociology, almost no attention has been given to the temporal shapes of effects (Kelly and McGrath 1988). Sociologists often seem to be quite ignorant about the fact that causal effects could be highly time-dependent, too. They normally assume that there is an almost all-at-once change in the dependent variable that is then maintained. However, the effect may be very time-dependent too. For example, (1) it may gradually increase; (2) at first rise, reach a maximum and then decrease; or (3) show a cyclical pattern over time (see Blossfeld and Rohwer 1995). Thus, an appropriate understanding of causal relations between variables should take into account that the causal relationship itself may change over time. This seems particularly important in sociological applications of causal reasoning. In these applications we generally cannot rely on the assumption of eternal, time-less laws but have to recognize that the causal mechanisms may change during the development of social processes. In fact, analyses of these changes of mechanisms is usually what is of particular interest in sociology.

The Principle of Conditional Independence

Combining these ideas, a causal view on parallel and interdependent processes becomes easy, at least in principle. Given two parallel processes, Y_t^A and Y_t^B, a change in Y_t^A at any (specific) point in time t' may depend on the history of both processes up to, but not including t'. Or stated in another way: what happens with Y_t^A at any point in time t' is conditionally independent of what happens with Y_t^B at t', conditional on the history of the joint process $Y_t = (Y_t^A, Y_t^B)$ up to, but not including t'. Of course, the same reasoning can be applied if one focuses on Y_t^A instead of Y_t^B as the "dependent variable." Blossfeld and Rohwer (1995) call this the principle of conditional independence for parallel and interdependent processes.[87]

The same idea can be developed more formally in the event history framework. Beginning with a transition rate model for the joint process, $Y_t = (Y_t^A, Y_t^B)$, and assuming the principle of conditional independence, the likelihood for this model can be factorized into a product of the likelihoods for two separate models: a transition rate model for Y_t^A which is dependent on Y_t^B as a time-dependent covariate, and a

[87] The terminology is adapted from Gardner and Griffin (1986), and Pötter (1993).

transition rate model for Y_t^B which is dependent on Y_t^A as a time-dependent covariate.[88] Estimating the effects of time-dependent (qualitative and metric) processes on the transition rate (or action process) can then easily be achieved by applying the method of episode splitting (see Blossfeld, Hamerle, and Mayer 1989; Blossfeld and Rohwer 1995).

Actors, Probabilistic Causal Relations and the Hazard Rate

If sociological phenomena are always directly or indirectly based on actions of individuals, then sociology cannot only deal with associations among variables (e.g. pregnancy/birth and marriage) per se, but with variables that are associated via acting people. There are at least three consequences for the empirical analysis of causal relations in the social sciences:

First, if individuals relate causes and effects through their actions, then explanation of social processes should be related to individuals (principle of methodological individualism). This is why life history data on individuals, and not aggregated longitudinal data, provide the most appropriate empirical evidence for hypotheses about social change. It is only with these data that one can trace the courses of action at the level of each individual over time.

Second, as discussed in detail above, the explaining or understanding of social processes requires (see Elster 1979): (1) a time-related specification of structural constraints which cut down the set of abstractly possible courses of action to a vastly smaller subset of feasible actions[89]; and (2) mechanisms that single out which of the feasible courses of action shall be realized. Because this is done by individuals, these mechanisms must rest on the tastes, beliefs, expectations and constraints of the agents. In particular, it must be based on rational- expectations. "The term rational-expectations....should not be confused with the unrelated concept of rational choice. A person giving a rational-expectations response to an intentions question would begin by recognizing that future behavior will depend in part on conditions known at the survey and in part on events that have not yet occurred" (Manski 1995; 102-103).

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[88] The mathematical steps leading to this factorization are, in principle, very easy but unfortunately need a complex terminology. The mathematical apparatus will therefore not be given here. The mathematics can be found in Blossfeld and Rohwer (1995), Gardner and Griffin (1986), Pötter (1993), and Rohwer (1995). An important implication is that since not only the states, but also functions of time (e.g. duration) can be included conditionally, the distinction between state and rate dependence proposed by Tuma and Hannan (1984) loses its meaning (see also Pötter 1993).

[89] Here, we must be careful because by taking constraints as given we tend to ignore the case that individuals sometimes do not choose among the given alternatives, but try to either open more for themselves or close some to other people (see Gambetta 1987).

However, the future evolutions of these conditions cannot be predicted by the respondent with certainty. Thus, if we really want to test propositions derived from rational choice models, we have to gather additional time-related data on these unobservable entities. Since it is well known that retrospective questions concerning motivational, attitudinal, cognitive or affective states are particularly problematic, the collection of panel observations of these states, combined with retrospective information on behavioral events since the last panel wave, seems to be an appropriate and feasible data collection design.[90]

Against such causal analytical studies, it is sometimes argued that since human actors act intentionally and behavior is goal-oriented, the intentions or motives of actors to bring about some effect in the future causes the actor to behave in a specific way in the present (Marini and Singer 1988). This does not however contradict our causal view. One simply has to distinguish intentions, motives or plans as they occur in the present from their impact on the behavior which follows their formation temporally, and from the final result, as an outcome of the behavior. An expectation about a future state of affairs should clearly be distinguished from what eventually happens in the future. Therefore, the fact that social agents can behave intentionally, based on expectations, does not reverse the time order underlying our causal statements.

Third, if it is individuals that are doing the acting, then causal inference must also take into account the free will of individuals.[91] This introduces an essential element of indeterminacy into causal inferences. Hence, in sociology we can only reasonably account for and model the generality but not the determinacy of behavior. The aim of substantive (and statistical) models must therefore be to capture common elements in the behavior of people, or patterns of action that recur in many cases (Weber 1972; Goldthorpe in this volume). Theoretical models in sociology must not seek to explain the behavior of single individuals, but the behavior of aggregate entities such as groups. In other words, in social science applications, randomness has to enter as a defining characteristic of causal models. We can only hope to make sensible causal statements about how a given or (hypothesized) change in variable Y_t^A (e.g.

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[90] In the past, social psychologists in particular have expected too much correspondence between stated intentions and subsequent behavior. They have written that intentions and behavior should coincide. For example, Ajzen and Fishbein (1980:50) write, "we are claiming that intentions should always predict behavior". Demographers, on the other hand, have contended that individual-level divergences between intentions and behavior should average out in the aggregate. However, in reality, both premises are flawed. Intentions and behavior may diverge substantially, both at the individual level and in the aggregate, whenever behavior depends on events not yet realized at the time of the survey. This is the case even if intentions data provide the best predictions of behavior that can be made, given the information available when the survey is performed (Manski 1995: 109).

[91] By "free will" of individuals, I mean they are free agents with wills of their own. They are not pre-determined by processes which they do not control, but they can act according to any idea.

pregnancy/birth) in the past affects the probability of a change in variable $Y_{t'}^{B}$ (e.g. marriage) in the future. Correspondingly, the basic causal relation becomes

$$\Delta Y_t^A \rightarrow \Delta Pr\ (\Delta Y_{t'}^B) \qquad t < t'$$

In the social sciences, this interpretation seems more appropriate than the traditional deterministic approach. The essential difference is not that our knowledge about causes is insufficient, allowing only probabilistic statements (see Lieberson 1991), but that the causal effect to be explained can only be a probability. Thus, probability in this context is not just a technical term anymore, but must be considered a theoretical one: it is the propensity of social agents to change their behavior intentionally.

Using event history data and hazard rate models, the causal reasoning underlying our approach can therefore be restated in a somewhat more precise form as

$$\Delta Y_t^A \rightarrow \Delta r(t') \qquad t < t'$$

As a causal effect, the changes in covariates Y_t^A in the past may lead to changes in the transition rate r(t') in the future, which in turn describes the propensity that the actors under study will change their course of action. This causal interpretation requires that we take the temporal order in which the structural constraints evolve and the actors with their time-related beliefs and motivations seriously.

4. Concluding Remarks

During the last 15 years, there has been an explosion of rational choice scholarship in the social sciences. The purpose of this paper has been to discuss some of the reasons why this development has had surprisingly little influence on large-scale data analysis. My thesis is that in the process of establishing rational choice theory as the only coherent and unified sociological approach, its proponents have pigeonholed their rivals, caricatured competing theories, exaggerated existing theoretical cleavages, overlooked their own conceptional weaknesses, downplayed the difficulties of their empirical applications, and neglected more recent and actually quite successful theoretically driven research programs based on longitudinal data.

Because rational choice theory is fairly established in sociology today, the chances are quite good that the current unproductive dualism between macro-level and micro-level approaches could be overcome. Theoretically powerful sociological analyses must pay attention to both structural- and micro-level issues. However, not in the usual static way. Any macro-micro framework must recognize that time matters in this relationship. It must identify the particular historical structures and processes which dominate the changes occurring in a given population and it has to specify the causal mechanisms that allow us to trace the encounters of intentionally acting individuals with the flow of history as a series of choice processes. An important advancement in this respect has been that longitudinal data can be studied by new statistical methods in a stepwise time-related fashion. Event history analysis provides effective tools to test causal propositions derived from a dynamic combination of micro- and macro-level

considerations. What is still largely missing are more systematic time-related data collection efforts based on rational choice conceptions, covering data not only on behavior but also on tastes, beliefs, expectations as well as decisions. This type of sociological research is not easy to conduct and is still at its rudimentary beginnings. But only such studies will allow us to achieve a more rigorous empirical analysis of rational choice propositions and enable us to find out whether rational choice thinking really means progress in applied research.

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