3. **Analytical sociology**

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1. **INTRODUCTION**

The observation that sociology seems hopelessly multi-paradigmatic is not new (Ritzer 1975). Sociologists of different confessions have repeatedly made the diagnosis that the discipline is highly fragmented and proposed various typologies identifying ways of understanding sociology that emphasize different tasks, goals, and audiences (see, among others, Boudon 2001; Goldthorpe 2004; Burawoy 2005; Abbott 2007a). Typically, as soon as these theoretical grids are posited, disagreements arise on which types of sociology should be given priority to re-invigorate the discipline and reduce its fragmentation (for a recent example, see Turner 2019, and Romero 2020).

Raub, De Graaf & Gërxhani (see the chapter on rigorous sociology in this *Handbook*, RDG hereafter) also believe that sociology is more fragmented than other disciplines but their proposal to counter this tendency is different. Rather than defending the unifying potential of one specific type of sociology, they want to foster ‘unity in diversity’. Within the overall fragmentation of sociology, they do think that it is actually possible to recognize research programs that ‘share core methodological standards’. RDG’s goal is to identify, thus making (more) visible, this core. ‘Rigorous’ sociology (RS, hereafter) would amount to the family of approaches that constitute variations on these ‘shared guidelines’. RDG want to be pluralistic, both theoretically and methodologically. They overtly claim to pursue an ‘integrative perspective’ that emphasizes commonality over differences among research programs. Thus, RS, they remark, should be understood as an ‘umbrella label’ rather than a new way of doing sociology.

In this chapter, I consider a meta-theoretical framework, i.e. ‘analytical sociology’ (AS, hereafter), which has been elaborated over the last 25 years around the concept of mechanism-based explanations (see Hedström & Swedberg 1996). Overall, AS can be seen as ‘an empirically-oriented, experimentally and computationally-based *macro-sociology* with clearly explicated and realistic micro- and network-level foundations’ (Manzo 2014, pp. 9, 38). In RDG’s view, AS is ‘one of the strands of RS’. On a programmatic level, this seems descriptively accurate. For instance, a comparison of the features that RDG regard as defining the common core of RS with the seven postulates that Manzo (2014, pp. 5–7) proposed to summarize AS’s principles, would show that AS’s ideal-typical research strategy share all RS’s key features. I will not pursue this abstract comparison here. AS’s programmatic principles have already been extensively exposed (see, in particular,
Hedström 2005; Hedström & Bearman 2009), and critically evaluated several times (see, among others, Abbott 2007b; Manzo 2010; Opp 2013; Kalter & Kroneberg 2014; Léon-Medina 2017). Meta-theoretical discussions of AS clearly attracted more attention than AS-related substantive works whereas, as Edling & Rydgren (2016, p. 1139) caustically commented, ‘the proof of the pudding is always in the eating’.

For these reasons, I will assess the extent to which AS contributes to RS by discussing AS in action rather than in theory. In particular, I first investigate the articles that were awarded the ‘Robert K. Merton Award’ (or an honorable mention) by the International Network of Analytical Sociology between 2013 and 2020 – a prize created in 2012 to acknowledge the best AS paper (see Table 3.1). Of these pieces of research, I examine, in the following sections, their **explananda**, their **explanans**, and the way they link the **explanans** to the **explanandum** through data and methods. These three dimensions actually correspond to the three groups of core features of RS as presented by RDG, which essentially define what the focus of empirical research is in RS (**explananda**), how theory is constructed (**explanans**), and how theory is linked to empirics (i.e. data and methods). Then, I consider a further selection of journal articles written by authors of AS manifestos and/or scholars who contributed to AS’s consolidation, and examine how AS in action copes with features of RS that RDG identified as important elements of RS over and above issues of theory formation, empirical research and links between theory and empirics.

Since the analysis of these substantive works showed that AS at work contains all the defining features of RS, I finally ask whether AS simply is a strand of RS or can equally be seen as an umbrella-like approach with similar integrative ambitions for sociology. A short summary of the analysis concludes the chapter.1

## 2. TYPICAL AS EXPLANANDA

In RDG’s view, a key feature of RS is ‘that macro-outcomes and established empirical macro-level regularities are the core **explananda** of sociology’. The Merton awarded articles well illustrated this feature in practice. The third column in Table 3.1 shows that each article focused on well-identified ‘structural properties’, i.e. cross-sectional and/or dynamic patterns of behaviors or outcomes across socio-economic groups and/or social contexts that cannot be understood, measured and explained by reference to any single member of the population under examination (for this working definition of ‘social facts’, see Ylikoski 2012).

Within the Merton awarded articles these structural properties take a variety of forms in AS. They can be **points of equilibrium** of the social system. This is the case of DiMaggio & Garip’s (2011, p. 1899) analysis of the temporal stability of intergroup inequality in at-home internet use in the US between 1997 and 2007, as well as of Goldberg & Stein’s (2018, pp. 897, 903, 908) study of how clusters of cultural practices emerge from a

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1 The substantive works I studied in this chapter may be submitted to a different question, i.e. the extent to which they followed AS’s programmatic principles, and, in this sense, they represented what AS tries to achieve rather than simply being illustrations of high-quality sociological research. I addressed this question, and provided a qualified positive answer, elsewhere (see Manzo 2021). Here I build on this result, and ask the more specific question of knowing how substantive works following AS principles relate to RS as defined by RDG.
Table 3.1  *Articles that received the Merton award (or an honorable mention, ‘h’) by the International Network of Analytical Sociology between 2013 and 2020*

<table>
<thead>
<tr>
<th>Year</th>
<th>Winner</th>
<th>Explanandum (Context)</th>
<th>Explanans (Action)</th>
<th>Explanans (Transformation)</th>
<th>Rational action?</th>
<th>Data</th>
<th>Methods</th>
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</thead>
<tbody>
<tr>
<td>2020</td>
<td>Van de Rijt (2019)</td>
<td>Temporal persistence of status hierarchies with quality/status mismatch</td>
<td>Others’ choices help to reduce uncertainty (rational imitation)</td>
<td>Heuristic</td>
<td>Experimental data</td>
<td>Choice formation mathematical model &amp; large-scale, web-based experiments</td>
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<tr>
<td>2019</td>
<td>Goldberg &amp; Stein (2018)</td>
<td>Patterns of clustered cultural practices</td>
<td>Strive for cognitive consistency</td>
<td>Heuristic</td>
<td>–</td>
<td>Agent-based modeling</td>
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<tr>
<td>2018</td>
<td>Aksoy &amp; Gambetta (2016)</td>
<td>Social patterns of veiling in Muslim dominant and non-dominant contexts</td>
<td>Increasing women’s education, employment and urbanization</td>
<td>Heuristic</td>
<td>–</td>
<td>Structural equation modeling</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Authors</td>
<td>Title</td>
<td>Key Points</td>
<td>Methods</td>
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<td>2017</td>
<td>Keuschnigg &amp; Wolbring (2015)</td>
<td>Variations in norm compliance as a function of contextual cues and social capital</td>
<td>Community-level social capital; traces of past norm violations</td>
<td>Need to assess conviction probability; desire to escape sanctions</td>
<td>Prior norm violations change incentives to further norm violations</td>
<td>Bounded rationality – heuristic (others’ choices convey information on risk of conviction)</td>
<td>Experimental data &amp; survey data</td>
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<td>2016</td>
<td>Cowan (2014)</td>
<td>Patterns of moral attitudes towards value-sensitive practices and events</td>
<td>Distribution of miscarriage/abortion; distribution of political attitudes</td>
<td>Stigmatization avoidance tendency</td>
<td>Interdependence between disclosure choices and hearing attitudes</td>
<td>Absent</td>
<td>Cross-section survey data &amp; qualitative data from health system</td>
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<td>2015</td>
<td>Bruch (2014)</td>
<td>Changes in income inequality &amp; residential segregation by race</td>
<td>Race group size, within- and between-race income inequality</td>
<td>Mobility choices depend on income and in-group preferences</td>
<td>Prior moves change neighborhoods’ desirability</td>
<td>Absent</td>
<td>Longitudinal survey data &amp; Census data</td>
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<td>2014 (h)</td>
<td>Skvoretz (2013)</td>
<td>Homophily patterns in marriage, dating and co-habitation</td>
<td>Group size sets the encounter opportunity structure</td>
<td>Strive for similar others; probabilistic rejection of dissimilar others</td>
<td>Interdependence of attraction and rejection choices</td>
<td>Absent</td>
<td>Cross-section comparative survey data</td>
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<td>2013</td>
<td>DiMaggio &amp; Garip (2011)</td>
<td>Patterns of intergroup inequalities in technology adoption and migration</td>
<td>Differential resources/homophilous ego’s social network on resources</td>
<td>Following others’ choices provide utility gains and information</td>
<td>Prior choices by members of ego’s social network</td>
<td>Heuristic (Others’ choices convey information on attractiveness)</td>
<td>Cross-section and longitudinal survey data</td>
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<tr>
<td>2013 (h)</td>
<td>Kroneberg &amp; Wimmer (2012)</td>
<td>Trends in the structure of political alliances</td>
<td>Differential resources/power asymmetry</td>
<td>Strive for resource control and cultural similarity</td>
<td>Dynamic sequence of offers and counter-offers</td>
<td>Weak rationality, endogenous preferences, and cultural motives</td>
<td>Archive historical data</td>
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</table>
learning process where individuals progressively come to associate specific subjective meanings to specific cultural practices.

Structural properties of interest can also be transitions between systemic equilibria. This is the case of Kroneberg & Wimmer’s (2012, pp. 177, 198, 220–221) study of macroscopic patterns of historical political changes ‘(...) from the estate model of society under the ancien régime, through populism, to fully inclusive nation building’, with a particular focus on France (1300–1900) and the Ottoman Empire (1500–1900). This is also the case of Van de Rijt’s (2019, pp. 1469, 1470, 1472) analysis of the potential temporal instability of status hierarchies where inferior options initially outperform superior ones.

Structural properties of interest can also be dynamic flows such as when DiMaggio & Garip (2011, p. 1916) studied the variation over time of the rates of intergroup rural–urban migrations among 22 rural villages in Thailand between 1972 and 2000.

Some Merton awarded articles focused on associations between contextual features and distributions of individual attributes or choices. This type of structural properties is illustrated by Polavieja’s (2012, pp. 594, 620) study of the dependence of gender-based investments in job-specific skills on gender-based occupation rates in 234 different regions of 24 European different countries; by Keuschnigg & Wolbring’s (2015, pp. 97, 98, 103) analysis of the impact of the accumulation of signs of physical and social disorder, and of level of social capital, on the probability of compliance to social rules for low-cost behaviors in various districts of a German city; and, by Aksoy & Gambetta’s (2016, p. 372) analysis of social patterns of Muslim women’s propensity to veil (in Belgium, Turkey and 25 other Muslim countries) as a function of those women’s socio-economic attributes, levels of religiosity and the type of neighborhood they live in.

Structural properties of interest can also be associations between population distributions. This is the case of Bruch’s (2014, pp. 1223, 1224, 1246) study of the temporal interdependence between the size of race groups, the levels of income inequality within and between those groups and the resulting patterns of racial residential segregation in major American cities between 1980 and 2000. This is also the case of Cowan’s (2014, p. 466) focus on the connection between patterns of disclosure of private events (such as miscarriage and abortion), and the temporal stability of moral attitudes towards these events among contemporary American adults.

Finally, in two cases, Merton awarded articles focusing on configuration of social ties. In particular, Skvoretz (2013, p. 489) wanted to explain variations in homophily across various socio-demographic groups in couple formation as observed in the US and several European countries. Leszczensky & Pink (2019, pp. 394, 397) studied the levels and temporal variations of ethnic segregation in at-school adolescent friendship networks in Germany as a function of students’ ethnic identification.

No matter the specific content and form of the structural properties of interest, all Merton awarded articles formulated the explanandum in connection with a why-question: the main goal always is to understand the source of the structural properties of interest. The why-question is often formulated in terms of ‘puzzles’, i.e. an intriguing problem that arises from the contradiction between facts or between theoretical expectations and empirical observations (see, for instance, DiMaggio & Garip 2011, pp. 1988, 1895, 1913, 1914; Kroneberg & Wimmer 2012, p. 179; Polavieja 2012, pp. 592–593; Aksoy & Gambetta 2016, pp. 792, 803; Goldberg & Stein 2018, p. 898).
Thus, overall, the Merton-awarded articles show that substantive works in AS are characterized by the same macroscopic focus and explanatory ambition that RDG identified as a foundational feature of theory construction and empirical research in RS.

3. THE TYPICAL STRUCTURE OF AS EXPLANANS

In RDG’s view, RS tends to approach explananda in the following way: ‘explananda at the macro-level follow from an explanans that includes assumptions on macro- and micro-conditions, on micro-level regularities, and on macro-to-micro as well as on micro-to-macro links.’ The way the Merton awards answered the why-question they raised followed exactly this logic (see columns 4–6 of Table 3.1). In particular, to build the explanans, each article formulated a set of hypotheses on (1) the pathways through which the context in which actors act shapes their beliefs, preferences and/or opportunities, i.e. a situational mechanism; (2) the principles underlying actors’ actions, i.e. an action-formation mechanism; and (3) how action interdependency progressively generates the macro-outcome of interest, i.e. a transformation mechanism (for this typology of mechanisms in AS, see Hedström & Swedberg 1996, pp. 296–298).

Because of space limitation, I illustrate the presence of this common structure by considering one Merton-awarded article’s explanans in detail per type of explanandum documented in the previous section.

DiMaggio & Garip (2011) focused at the same time on a point of equilibrium (the generation of inequalities in internet adoption among individuals with different income and education) and a population dynamic flow (over-time divergent rural–urban migration rates between Thai villages). To explain these macroscopic facts, DiMaggio & Garip (2011, pp. 1888, 1889, 1893, 1900) formulated a common mechanism made of the following elements: (1a) actors possess different amount of resources to sustain the costs of subscribing to the internet or to migrate; (1b) actors experience proximate social networks that tend to be homophilous with respect to socio-economic factors; (2) when deciding whether to adopt or migrate, actors look at prior choices among their relevant direct contacts (see Table 3.1); (3) relying on choices of proximate others with a similar amount of resources will amplify non-adoption among have-not and adoption among haves. Network homophily on factors that are associated with adoption is seen as the necessary condition under which the posited mechanism is likely to generate intergroup inequality (DiMaggio & Garip 2011, pp. 1888, 1891).

Among Merton awards focusing on cross-sectional associations between contextual features and distributions of attributes or choices, let us consider Aksoy & Gambetta (2016, pp. 792, 793, 796) who, to explain the variation of veiling behaviors among Muslim women, and, in particular, the possible counter-intuitive positive correlation between modernization and veiling frequency, posited the following mechanism: (1) modernization leads Muslim women to experience more education, and greater access to job market and to urban settings; (2a) Muslim women may veil because they believe this is a religious requirement but (2b) they may also veil to signal their moral integrity to members of their home community as well as to new social contacts outside this community; (3) if so, modernization, by making religious beliefs less prominent, may reduce veiling’s average frequency but, by exposing Muslim women to more secularized settings, it may increase
the propensity of veiling among women who remain highly religious and also are highly educated, urban, and middle-class. If this signaling mechanism is at work, Aksoy & Gambetta (2016, pp. 794–795) argued, the following additional facts should also be observed: highly religious women living in urban neighborhoods where veiling is less frequent and more various in terms of dressing manifestations, as well as highly religious women living in neighborhoods where Muslims are a minority, should exhibit a higher propensity to veil, both settings increasing the necessity to signal their moral integrity and pioussness. This nicely illustrates that some AS-awarded substantive works also followed another principle that RDG identified for RS, i.e. the idea that a strong explanans should allow the drawing of implications that are not contained in the explanandum the ‘theory was designed to explain in the first place’.

As to explananda under the form of associations between population distributions, let us consider Cowan’s (2014, pp. 471–472) analysis of the impact of the distribution of demographic events such as miscarriage and abortion on population-level opinion changes. To explain the possible disconnection between the two, Cowan formulated the following mechanism: (1a) at any given time, a stock of private events (miscarriage and abortion, here) exists in the population; (1b) women personally experiencing these events may decide to share their experience to relevant confidants; (2a) when disclosing secrets, actors want to avoid stigmatization; (2b) as a consequence, private events that are less likely to be disapproved will be more frequently disclosed, and they will be more frequently disclosed to those confidants that are perceived as having more favorable views on the to-be-disclosed event; (3) the dynamic interdependence between disclosure choices and hearing attitudes is likely to create what Cowan (2014, p. 495) called a ‘self-fulfilling illusion’: more stigmatized events will be less present in actors’ subjective perceptions than they really are present in the population, and those who are more likely to disapprove the events will be less likely to be aware of them. This phenomenon is likely to slow down attitude changes. Thus, Cowan’s (2014, p. 484) mechanism identified awareness of others’ behavior as a necessary condition for social influence and consequent macro-social changes.

Finally, among papers aiming at explaining features of configuration of social ties, let us consider the way Skvoretz (2013, pp. 491, 492, 493, 499) explained the variations of homophily on various attributes in different types of couple formation relationships. To this aim, he proposed a mechanism involving the following elements: (1) the demographic size of groups provides actors with certain opportunities for encountering similar and dissimilar others; (2) actors are driven by a tendency toward homophily so that their preference for similar others biases the structural constraints; in particular, (2a) when someone meets a similar individual, then the tie is always formed (attraction mechanism), otherwise, (2b) when someone meets a dissimilar other, the tie is rejected with a given probability (repulsion mechanism); (3) the one’s attraction/rejection choices dynamically change the opportunity encounter structures for subsequent attraction/rejection choices. Depending on the groups’ sizes and the intensity of the rejection bias, variations in the level of homophily along different attributes can emerge in different settings (see Skvoretz 2013, p. 500). Leszczensky & Pink (2019, pp. 398–399) added explanatory depth to the micro-level part of Skvoretz’s mechanism by introducing a specific motive that may further explain dyadic attraction and repulsion, namely the intensity of ego’s and alter’s ethnic identification.
Thus, by structuring their *explanans* by context’s effects, *action* principles, and *transformation* processes, each Merton-awarded article ultimately provided a ‘mechanism’ understood as a chain of events unfolding at different scales, these events being fueled by the actions and interactions of well-specified entities who follow clearly-identified action logics, operating under overtly explicated conditions, and triggering changes that generate the observed connections with some regularity (for this definition of mechanism in AS, see Hedström 2005, p. 25; Manzo 2014, p. 14; Keuschnigg et al. 2018, p. 5). By doing so, these AS-awarded substantive works provided clear illustrations of the generic form of the explanation that RDG regarded as typical of RS, i.e. an explanation organized along the three main branches of the Coleman boat and often (but not always, RDG admit) focused on the micro-to-macro links with a special attention to social interactions between actors. Moreover, the action-component of the Merton awarded articles’ *explanans* shows in practice that substantive works in AS exploit a variety of logics of action, only partly inspired by rational action theory (for a summary, see column 7 in Table 3.1). This is an important feature of AS, which is in full agreement with RDG’s repeated claim that ‘micro-macro explanations’ and ‘methodological individualism’ in RS ‘do not presuppose employing assumptions on rational choice’.

4. AS DATA AND METHODS

RDG repeatedly claimed that a key aim of RS is linking theory construction and empirical research, and that this is done through ‘a broad variety of empirical strategies and methods’, including ‘statistical modeling’, ‘generative models’, ‘observational’ and ‘experimental designs’ as well as ‘qualitative designs’. Thus, the last feature of the Merton-awarded articles that must be investigated is the way these pieces of research connected their *explanandum* to the proposed *explanans* through data and methods.

In this respect, columns 8–9 in Table 3.1 synthetically show that, with one exception, all articles exploited various types of empirical evidence, and often combined different methodological approaches to document the postulated mechanism. However, if one considers the main method adopted, four research designs can be identified. Because of space limitations, I dissect one example per methodological approach and only point to major variations among papers sharing the same approach.

Four Merton-awarded articles built their testing strategy on various types of *agent-based computational models* (for a general discussion of this approach, see Flache, Mäs & Keijzer’s chapter on computational approaches). Among them, Bruch (2014) provided a particularly well-developed example of data-to-model exchange. In particular, she first designed a simplified agent-based model with rudimentary spatial features. In this model, only artificial agents’ residential mobility choices were empirically calibrated through discrete choice logit models estimated on panel data describing individual-level income dynamics. This first model was used to manipulate the group size and the level of within- and between-race income inequality (pp. 1236, 1243). Then, she exploited census data and made the same agent-based model more realistic by incorporating the geography of three US large cities as well as the temporal evolutions of income inequality and group size in these cities (pp. 1245–1246). Both versions of the computational model pointed to the same possible offsetting dynamic: a decrease in income inequality between races can make
poor blacks less isolated (from the white population) but wealthy blacks more isolated (from the black population), which can leave residential segregation unchanged or even increase it (pp. 1252, 1255). Finally, to check if ‘the model is providing inferences that accurately capture mechanisms at work in real cities’ (p. 1256), Bruch described (through fixed-effects models estimated at the metro area-level) segregation levels’ changes in 93 major American cities between 1980 and 2000 as a function of changes in between- and within-race income inequality (as well as race group sizes). Traces of the offsetting mechanism that appeared within the simulations were also found in the empirical data described by the statistical models (pp. 1264, 1265).

Leszczensky & Pink (2019) provided an even more extreme illustration of data-driven agent-based models to document a mechanism. In fact, they studied longitudinal school-based friendship network data through ‘stochastic actor-oriented models’ (SAOM), which they explicitly related to agent-based computational models. Compared with them, SAOM exploits the to-be-explained network iteratively as a way to reach proper statistical estimations of the model’s parameters reflecting the mechanisms that were postulated as the drivers of the network formation process. In this sense, SAOM are increasingly considered as a specific form of agent-based models combining empirical calibration and output validation with statistical estimation (for a systematic discussion of this perspective, see Steglich & Snijders’ chapter on stochastic network modeling; for a critical analysis, see Daza & Kreuger 2021).

Goldberg & Stein (2018) are at the other extreme of the possible ways of using an agent-based computational model to study mechanism-based explanations. In fact, to show that patterns of clustered cultural preferences can emerge from ‘associative diffusion’ – i.e. a mechanism where actors progressively attach meanings to practices by observing co-occurrences of practices in others’ observable behaviors – they overtly followed the principles of agent-based models with ‘low-dimensional realism’ according to which the simulation is used to determine the sufficient condition(s) under which a given macroscopic outcome can appear (p. 908). The model’s micro-level assumptions are carefully anchored to existing theories in cognitive psychology (pp. 908–910); the model’s parameter space is systematically explored (pp. 913–914); various robustness checks are performed, and alternative mechanisms are simulated (pp. 916–917). But the model’s parameters are not calibrated empirically, and the model’s implications are not confronted with empirical macro-patterns.

Two Merton-awarded articles attempted to link the proposed *explanans* to the *explanandum* through *mathematical models* but, in one case, the model was used to generate the *explanandum* whereas, in the other case, the *explanandum* was used to estimate some aspects of the formal model. In particular, Kroneberg & Wimmer (2012, pp. 180, 187, 188, 189, 191, 193, 196) relied on a mathematical model that combines, on the one hand, an exchange model formalizing how actors form their preferences over possible alliance configurations, and, on the other hand, a sequential, non-cooperative game model formalizing how negotiations between actors unfold. Crucial parameters of the exchange theoretic models, namely resource control and power, are based on ‘carefully researched historical data on the distribution of taxing capabilities, public goods provision, and military support in France (1300–1900) and the Ottoman Empire (1500–1900)’ (pp. 181–182), which, they claimed, ‘prevent us from simply assuming the parameter values that will generate the hypothesized outcomes’.

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Skvoretz (2013, pp. 489, 495, 499, 500) also relied on a mathematical model of homophilous tie formation but then he exploited empirical cross-tabulations on marriages, dating and cohabitation by race, ethnicity, religion, and education with the aim of estimating the variation of the values of the two main model’s parameters expressing the individuals’ bias for similar and dissimilar others across a variety of Western countries. Skvoretz (2013, pp. 500, 503) checked the robustness of his results by estimating the model on cross-tabulations artificially generated on the basis of known values of the attraction/repulsion parameters, and also studied various model’s extensions involving several forms of inter-group variability in the attraction/repulsion motives.

Various forms of experiments were also exploited by the Merton-awarded articles to connect the explanans to the explanandum (for a general exposition of experimental designs, see Gërxhani & Miller’s chapter on experimental sociology).

In particular, Keuschnigg & Wolbring (2015, p. 103) designed three field experiments (in Munich) where each participant acted in a natural environment and was not aware of being part of an experiment. In the first experiment, littering was used as treatment to signal physical disorder, and subjects were tempted to further littering by finding a nonsense flyer attached to the handlebar of their bike (p. 104); in the second experiment, jaywalking was used as treatment to signal social disorder, and subjects were tempted to same-norm violation by observing directly others’ jaywalking at pedestrian lights (p. 109); in the third experiment, a lost letter showing a varying amount of money was used as the treatment, and subjects were induced to fall in cross-norm violation, i.e. steal the letter after seeing physical disorder (namely, littering) (p. 112). All three experiments were set in locations with varying levels of social capital measured though a well-tailored questionnaire – for the first experiment (pp. 106–107) – and existing urban district-level data (pp. 109–111). A variety of small modifications in the experiment designs were tested to check the results’ robustness, and the basic set-ups of the first and the third experiments were also designed to allow replicability of previous experiments (p. 104). Compared with Keuschnigg & Wolbring, Van de Rijt (2019, p. 1472) framed his experiment through a mathematical model formalizing discrete choices under uncertainty and social influence, and performed a web-based (rather than field) experiment (for more details, see the chapter by Van de Rijt, which reproduces this Merton-awarded article as a showcase of RS).

Finally, four Merton-awarded articles attempted to trace the postulated mechanism by relying on multivariate statistical models estimated on cross-sectional survey data and, in one case (see DiMaggio & Garip 2011, pp. 1916, 1920, 1921), on longitudinal survey data (for a discussion of longitudinal designs and models, see Gangl’s chapter). An important common feature of these studies, which is especially visible in Aksoy & Gambetta (2016, pp. 792, 795), is that they estimated statistical interaction effects to track the postulated mechanism’s signature. This is an important point because AS originally followed Sorensen’s (1998, pp. 244, 245) critique of the lack of explanatory relevance of multivariate statistics partly due to fact that many regression-like models put more emphasis on main additive effects than on theoretically motivated interaction effects (see Hedström & Swedberg 1996, pp. 291–293; Hedström 2005). The Merton-awarded articles that relied on statistical modeling clearly learned that lesson (for a type of RS that is now especially interested in exploiting heterogeneity in the data, see Jackson’s chapter on sociology as a population science).
Thus, overall, all the Merton-award articles tried to connect the *explanans* to the *explanandum* through a variety of research strategies variously combining different types of data and methods. In this sense, AS-awarded substantive works are characterized by the same methodological pluralism that RDG considered as a core feature of RS and are in full agreement with RDG’s emphasis on various forms of formal model building to link theory and empirics.

5. DESCRIPTION, DIGITAL DATA, REPLICABILITY AND POLICY ANALYSIS IN AS

A selection of journal articles written by authors of AS *manifestos* and/or by scholars clearly involved in AS consolidation can help to assess (better than Merton-award articles allow) how AS copes with four important ingredients of RS that RDG identified over and above issues of theory construction, empirical research and links between theory and empirics.

The first of these elements is RDG’s qualification that RS values empirical research for theory testing, but also as a contribution to the ‘growth of descriptive knowledge about the social world’. Although AS *manifestos* do not programmatically contain a similar claim, Bearman (2012, p. 2) explicitly acknowledged the value of descriptive knowledge for AS (‘some of the richest descriptions of things are those things that cannot be seen or known by individuals’). Moreover, various AS-related substantive works, such as Spaiser et al.’s (2018) study of schools’ ethnic segregation patterns or Keuschnigg et al.’s (2019) analysis of urban growth primarily focused on exploiting new formal tools and/or massive register-based datasets to achieve a better description of macro-level patterns and dynamics, thus confirming in practice that AS does not despise *a priori* rich empirical descriptions. Similarly, Arvidsson et al.’s (2021) study of gender segregation on the job-market showed how the granularity of data allows pinpointing explanatory mechanisms that one could hardly have imagined without detailed description of those data.

Second, let us consider RDG’s remark that RS is open to ‘new technological opportunities’ provided by increased computational capabilities and new massive digital data. This nicely echoes Keuschnigg et al.’s (2018) position paper arguing for a closer link between AS and the larger field of computational social sciences. In particular, Keuschnigg and colleagues proposed seeing computational social sciences’ tools – among which they included agent-based computational models, large-scale experiments on the web, massive fine-grained time-stamp data, textual mining techniques – as having ‘the potential to accomplish for sociology what the introduction of econometrics did for economics in the past half century, i.e., to provide the relevant analytical tools and data needed to rigorously address the core questions of the discipline’ (p. 9). In contrast, in their view, the mechanism-based orientation of AS would bring to computational social sciences the explanatory depth that many studies in this field still miss (for a similar argument from within the social simulation community, see Flache, Mäs & Keijzer’s chapter).

Third, let us consider the attention that RS pays, according to RDG, to the issue of robustness checks and replicability to foster scientific transparency and integrity. In this
respect, it should be emphasized that all Merton-awarded articles contained various forms of sensitivity and robustness checks. When multivariate statistical models were used, this took the form of measurement and the model’s specification variations (see, for instance, Polavieja 2012, pp. 603, 607, 610, 612, 616–617); when mathematical and simulation models were used, sensitivity analysis on input values and the model’s assumptions was performed (see, for instance, Kroneberg & Wimmer 2012, Appendix C; Bruch 2014, pp. 1237, 1239, 1248); when experiments were used, design variations were evaluated (see, for instance, Van de Rijt 2019, p. 1487). Moreover, AS has explicitly called for reproduction and replication analyses that also contribute to scientific transparency (for an extensive discussion of this topic, see Auspurg & Brüderl’s chapter on reproducibility and credibility). An illustration of this can be found in Manzo & Baldassarri (2015) who exploited only published material to re-implement, through agent-based computational simulations, Gould’s game-theoretic model (and the follow-up model by Lynn et al. 2009) of status hierarchies. They demonstrated that these models, when they were studied over their entire parameter space, in fact led, in some cases, to unrealistic macroscopic results, and, in other cases, to macroscopic results that were only partially consistent with the expected macroscopic consequences of the microscopic mechanisms for which the models were built (for a discussion of Gould’s model, see Buskens, Corten & Raub’s chapter on social networks).

Finally, let us consider RDG’s emphasis on the value that RS recognizes to policy-oriented applications of sociological knowledge. This is an especially important issue that is absent from AS manifestos. The Merton-awarded articles also only occasionally sketched the potential policy implications of their results, and the details of the possible policies were never spelled out (see Polavieja 2012, pp. 621–622; Aksoy & Gambetta 2016, pp. 803–804; Leszczensky & Pink 2019, p. 414). However, substantive works inspired by AS principles and methods that frontally engage with policy analysis exist. For instance, Manzo & Van de Rijt (2020) studied how network interventions could help mitigate virus propagation. To do so, they first designed an agent-based computational model where a virus with the (empirically-calibrated) transmission properties of the SARS-CoV-2 spreads through an artificial network of close-range dyadic contacts whose degree of heterogeneity was calibrated through nationally representative diary-based contact surveys (and various amounts of local clustering of those contacts were allowed). Then, they exploited the computational model to assess how effectively epidemic peaks could be mitigated if individuals with a number of daily close-range social contacts larger than the average individual (i.e. network hubs) were prioritized for vaccination. They found that hub-targeting was highly effective, and showed that specific network properties could be exploited to design policies that maximize the chance of getting to hubs, without knowing the underlying network of physical contacts. Thus, by showing how one can intervene on complex chains of interdependent actions to change the social dynamic of virus propagation, Manzo and Van de Rijt provided an illustration of AS’s potential for policy analysis along the lines outlined by RDG for RS, i.e. by using micro-macro models that help policymakers frame societal problems as the macroscopic unintentional consequences of interdependent behaviors.
6. AS: RS STRAND OR TWIN?

The observation that the *modus operandi* of various substantive works inspired by AS’s principles and methods largely overlaps with all the essential features of RS raises an important question: is AS a simple ‘strand’ of RS (as RDG suggest) or are RS and AS in fact twins in the sense that AS can also work as an umbrella-like approach with equivalent integrative ambitions for sociology? Obviously, the large overlap between AS at work and RS’s cognitive core that I documented does not *ipso facto* imply that AS can (or should be) conceived as an umbrella-like approach. However, AS, too, overtly displayed the ambition of providing a ‘common core’ for sociology with the ultimate goal of increasing the quality standards of the discipline as a whole. That is why, in my view, the observation that RS (as defined by RDG) and AS factually share the same *modus operandi* naturally leads to the question of whether or not they also share the same pluralistic and integrative intellectual project. I will suggest that the answer ultimately depends on the emphasis one puts on internal differences within AS itself. I consider a pluralistic understanding of AS more productive and empirically accurate than an insular account, but I perfectly understand that others may think otherwise.

To defend this view, let me first document the clear presence of an integrative ambition within the AS’s intellectual project. For instance, after reconstructing the historical roots of AS and discussing some critiques against it, Manzo (2010, p. 162, emphasis added) observed:

> the most distinctive feature of such an integrative framework is that it only provides a ‘syntax’ for explanation: that is to say, a set of rules on how hypotheses about mechanisms underlying the regularities of social life can be theoretically designed and empirically tested.

Along very similar lines, Hedström & Ylikoski (2014, p. 61, emphasis added) claimed:

> Analytical sociology *is not a new* sociological theory or method. Rather, analytical sociology is a reform movement within sociology and social theory [. . .]. It is an attempt to develop a constructive framework for thinking about sociological research and its aims. [. . .] The idea is to develop a meta-theory that is not just an ad hoc legitimation for one’s own pet theory, but a set of ideas that provides fruitful guidance for the production of explanatory sociological theories that are compatible with the results of other sciences and satisfy the criteria of clarity and precision.

The goal of providing an inclusive, rather than divisive, ‘common ground’ for the discipline seems indisputable in these AS characterizations. However, this constructive approach to AS was sometimes unrecognized. I see three main reasons for this.

First, some definitions of AS, while probably not shared by the majority of scholars involved in AS, may have contributed to creating the perception of a supposedly imperialistic attitude of AS aiming at ‘policing’ and ‘polishing’ the boundaries of ‘good’ sociology (see, on this point, Bearman 2012).² Not fully reconstructing the commonalities with older sociological traditions as well as the explicit integrative approach of those traditions has probably also contributed to reinforcing the impression that AS wanted to emphasize

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² As an example, the reader can consider the following statement: ‘analytical sociology should [...] be seen [...] as an effort to clarify (“analytically”) theoretical and epistemological principles which underlie any satisfactory way of doing sociology (and, in fact, any social science)’ (Demeulenaere 2011, p. 1).
differences rather than similarities (in particular, for the relationships between AS and
the structural-individualist research program, see Raub 2021). Thus, paradoxically (to
me), AS ended up being perceived as claiming that it was the only way of doing ‘good
sociology’ (see Little 2012), which led others to see analytical sociology as a ‘self-regarding
club’ (see Chattoe-Brown 2014).

Second, some comparisons between AS and other sociological approaches, in particu-
lar rational choice sociology, while explicitly recognizing overlaps, tended to emphasize
differences rather than similarities (see, in particular, Hedström & Ylikoski 2014, pp. 57,
64–67). This has probably contributed to make AS’s evolving position on action theory
less visible. In this respect, the major change was the move from proposing the Desire-
Belief-Opportunity framework as a substitute for rational choice theories (see, in particu-
lar, Hedström 2005, pp. 61, 65–55) – a view correctly criticized by Opp (2013; see also
Diekmann’s chapter on rational choice sociology) – to proposing that no theory of action
should have a special status as a general starting point for building explanatory models
(see, Hedström & Ylikoski 2014, p. 67). If this proposal is accepted, it becomes clearer
that AS, rather than opposing action theories, may act as an open framework where the
explanatory potential of various micro-level models can be confronted against empirical
data, thus fostering knowledge accumulation with respect to the conditions under which
this or that micro-model is more likely to operate (on this point, see Manzo 2014,
pp. 21–27). Kroneberg & Tutić (2021) seemed to recognize this possibility when they
distinguished a ‘strong’ and a ‘weak program’ within AS with respect to action theory,
the former believing in the importance of seeking a general theory of action to be used in
an axiomatic way, whereas the latter being agnostic about the action theory that should
inform theoretical model building. While the tension between these two approaches is
likely to continue, my point is that, as long as the ‘weak’ action program does not take a
radical form questioning the value and feasibility of intentional explanations themselves
(for a statement along these lines, see Hedström 2021), the ‘weak’ action program has an
integrative and pluralistic nature, which opens AS to an umbrella-like interpretation
similar to RS.

Finally, AS’s emphasis on agent-based computational models has probably also con-
tributed to many observers to perceiving AS as a specific research program rather than a
general framework for social inquiry (see, in particular, Morgan & Winship 2015, p. 341;
Kalter & Kroneberg 2014, p. 109; Edling & Rydgren 2016, p. 1140). However, here again,
different readings of AS are equally possible. On the one hand, one may consider the
presence of this simulation technique as a *condition sine qua non* for considering a given
piece of research as related to AS. Some schematic presentations of AS’s typical research
strategy may be read as pointing to this interpretation (see, for instance, the five-step
schema in Hedström & Bearman 2009, p. 16). To some extent, scholars who want to push
AS towards computational social sciences and complexity approaches may also be seen
as close to this view (see, for instance, Jarvis et al. 2021). On the other hand, agent-based
computational models may be seen as only one possible ingredient of a larger methodo-
logical approach that would make AS ‘a complex interface among multivariate statistics,
computational methods, mathematics, and experiments in which each method is mobi-
lized to accomplish specific tasks’ (see Manzo 2014, p. 37).

In this respect, we have seen that AS-related substantive works are methodologically
pluralistic in practice. Many of the Merton awards did not employ agent-based
computational models for connecting the *explanans* to the *explanandum*. Some of them were able to create aggregative dynamics from the bottom-up by using in-field or web-based experiments. At the same time, the Merton awards only analyzing cross-sectional data through multivariate statistical models were not entirely protected against the danger of proposing verbal narratives involving the micro-to-macro link without explicitly documenting under which conditions the postulated role of social interactions could lead to the system-level outcome of interest. For instance, Makovi and Winship’s (2021, Figures 1 and 2) representation, through directed acyclic graphs (DAGs), of the explanatory mechanisms proposed by Cowan (2014) and Aksoy & Gambetta (2016) clearly shows the absence of interactions from the statistical models estimated by these Merton awards despite their presence in the verbal narrative (for a pedagogic exposition of DAGs, see Breen’s chapter on causal inference). Thus, AS’s *programmatic claim* that agent-based computational models may constitute the most flexible tool to ‘recreate’ the macro-outcome of interest through simulating dynamic interdependent actions should be better interpreted as a warning against which one can judge how explicitly the micro-to-macro connection was modeled in a given case study.

In sum, depending on how nuances between claims made by scholars involved in AS are weighted, AS can alternatively be seen either as a specific, and quite narrow (if restricted to the use of a particular method), research program or as an integrative intellectual project federating a variety of theoretical and methodological options. Elsewhere I proposed to see these options as a set of ‘negative’ and ‘positive’ heuristics generating an ideal-typical benchmark for research design (see Manzo 2014, pp. 5–7, 10). The ideal character of the proposed set of guidelines comes from the fact that, for a variety of theoretical and practical reasons, it may be impossible, or even unnecessary, to perform all the requested tasks within a single piece of research. The empirical accuracy of this understanding of AS seems to me confirmed by the AS-related substantive works that I reconstructed in the previous sections. While I appreciate that others may want to read AS differently, it seems to me descriptively accurate to say that, when AS is understood as a flexible and integrative framework, it does not share with RS only the same cognitive content but it also pursues the same epistemic goal, i.e. working as an umbrella-like approach for a variety of research designs. For this reason, I submit to the reader the hypothesis that AS is a twin of RS rather than a simple strand of it.

### 7. CONCLUSION

In this chapter, I presented AS through a selection of substantive works inspired by its principles and methods. In particular, I inspected first the articles that were awarded the Merton award (or an honorable mention) by the *International Network of Analytical Sociology* between 2013 and 2020. I showed that these papers (synthetically compared in Table 3.1) exhibited a common *modus operandi* that contains all the principles RDG exposed as defining RS in terms of typical *explananda* (i.e. macro-patterns and trends), generic form of the *explanans* (i.e. micro-macro models along the main branches of the Coleman boat), and links between theory and empirics (in particular through various forms of mathematical, computational and statistical modeling).
Then, I considered a selection of additional pieces of research by scholars having shown a clear commitment to AS and demonstrated that further RS features involving descriptive knowledge, digital data, replicability, and policy analysis are also present within AS-related substantive works. This result seems to me especially important with respect to the connection between sociological knowledge and policy analysis. In terms of the sociological ideal-types I alluded to in the introduction, AS in fact clearly stands on the side of Boudon’s ‘cognitive’ sociology combined with Goldthorpe’s caution against under-evaluating ‘cameral’ sociology rather than on the side of various forms of ‘public’ sociologies. This probably explains why AS manifestos lack any programmatic reference to the potential relevance of mechanism-based explanations for policy analysis. Thus, it was remarkable to find that the principles and the tools of analytical sociology can be, and actually already are, used to think of policy interventions without renouncing the requirements of ‘sociology as a social science’ (to borrow Goldthorpe’s original label).

Finally, having established the large overlap between RS’s and AS’s cognitive content in terms of principles and methods, I went back to RDG’s view that AS is ‘one specific research program that contributes to RS’, and addressed the question of the extent to which AS in fact shares with RS a similar objective of reducing sociology’s fragmentation by identifying a common core of guidelines for high-quality sociological research. I identified factors that may have obscured, and run against this objective of AS, and argued that AS actually can be understood as an umbrella-like approach with the potential of irrigating and connecting various research fields through a flexible theoretical and methodological research agenda. It should be emphasized that this potential is not limited to bridges with more or less traditional strands of quantitative social sciences (such as social stratification research, see Manzo 2013). Similar to RS’s ambitions, AS’s synergetic potential also extends to qualitative approaches (for an example of integration between AS and ethnographic research, see Manzo et al. 2018). For this reason, I ultimately suggested seeing AS and RS as twins.

If so, should AS be seen as a friendly twin or as the evil twin? In my view, AS is a powerful ally of RS. Two epistemic projects, rather than one, that converge to the very same core of theoretical and methodological features, and, on this basis, try to push sociology to higher standards, seem to me a force, not a weakness. However, should the umbrella-like understanding of both AS and RS be perceived as a generator of conflicts rather than synergies, one sensible compromise would be to think in terms of relationships between AS and other strands of RS rather than confronting RS to AS directly. In this case, one may want to abandon the twin metaphor and resort to the Latin oxymoron primus inter pares in order to signal that AS is a ‘strand’ of RS with a special status in that AS pursues general integrative goals for the discipline that other RS strands have not displayed (yet) as overtly as AS did. The future will tell us which account is the most accurate.

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