Social Cohesion in International Comparison: A Review of Key Measures and Findings

Jan Delhey · Georgi Dragolov · Klaus Boehnke

Abstract Although social integration has always been a central sociological issue, there has never been a consensus how to approach the topic empirically. In the new millennium, social cohesion has emerged as a lead concept for measuring how integrated societies are—not the least, because many observers see the social fabric of modern-day societies in deep crisis. Consequently, scholars and think tanks have intensified their efforts to chart how strong the social glue of contemporary societies is, as well as which conditions strengthen or weaken it. The main goal of our article is to provide an overview of measures of social cohesion that have been specifically designed for cross-national comparisons. To this end, we compare selected measures with respect to what they measure, how, and for what purpose. We then highlight key empirical insights gained by these measures, touching upon the issues of levels, regimes, as well as determinants and outcomes of social cohesion. The review concludes that one of the measures, the Bertelsmann Social Cohesion Radar, stands out in terms of conceptual clarity, methodological sophistication, and richness of empirical findings.

✉ J. Delhey
Department of Social Sciences, Otto von Guericke University Magdeburg
P.O. Box 4120, 39016 Magdeburg, Germany
E-Mail: j.delhey@ovgu.de

G. Dragolov
Department of Social Sciences, Otto von Guericke University Magdeburg
P.O. Box 4120, 39016 Magdeburg, Germany
School of Business, Social and Decision Sciences, Constructor University
Campus Ring 1, 28759 Bremen, Germany
E-Mail: georgi.dragolov@ovgu.de; gdragolov@constructor.university

K. Boehnke
School of Business, Social and Decision Sciences, Constructor University; Bremen International
Graduate School of Social Sciences (BIGSSS)
Campus Ring 1, 28759 Bremen, Germany
E-Mail: kboehnke@constructor.university

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Sozialer Zusammenhalt im internationalen Vergleich: ein Überblick über zentrale Maße und Befunde

Zusammenfassung Obwohl die soziale Integration schon immer ein wichtiges Thema der Soziologie war, gab es nie einen Konsens darüber, wie man sich dem Gegenstand empirisch nähern sollte. In den letzten zwei Jahrzehnten hat sich dafür der soziale Zusammenhalt als ein Leitkonzept herauskristallisiert – nicht zuletzt, weil viele Beobachter den Zusammenhalt heutiger Gesellschaften in der Krise sehen. Mittlerweile liegen mehrere Vorschläge vor, wie der gesellschaftliche Zusammenhalt gemessen werden könnte. Das Hauptziel unseres Beitrags ist, einen Überblick über ausgewählte Messinstrumente zu geben, die speziell für den internationalen Vergleich konzipiert wurden. In einem ersten Schritt analysieren wir, was genau die ausgewählten Messinstrumente wie und mit welchem Erkenntnisinteresse messen. In einem zweiten Schritt erläutern wir die wichtigsten empirischen Erkenntnisse, die mit Hilfe dieser Messinstrumente gewonnen wurden, geordnet nach den Themen Stärke, Regime und Determinanten oder Folgen von Zusammenhalt. Unsere kritische Betrachtung kommt zu dem Schluss, dass der Bertelsmann Social Cohesion Radar hinsichtlich seiner Konzeption, Methodik und empirischen Anwendung gewisse Vorteile gegenüber den anderen Messinstrumenten besitzt.

1 Introduction

Although citizens' social trust and national identification are popular subjects in comparative sociology, social cohesion as the broader concept has long been absent from the agenda of "large-*N*" cross-national studies. This neglect had to do, in part, with the often-criticized conceptual fuzziness of cohesion (Bernard 1999), which makes it a bulky object of empirical investigation. Despite this fuzziness, the interest in mapping cohesion has grown considerably in recent years. The impression arises that in many countries of the world the social fabric of societies—the degree of social integration—is in crisis, owing to widening gaps between rich and poor, challenges posed by migration and multiculturalism, and disruptions caused by technological progress. In the wake of these concerns, national governments (a frontrunner: Canada), international organizations, and supranational bodies are increasingly interested in evidence on the cohesiveness of contemporary societies.

To meet this demand, scholars and social reporting initiatives have intensified their efforts to measure social cohesion. The multitude of approaches and concepts, however, makes it difficult even for experts to keep track. Although there are a number of reviews of the very *concept* of social cohesion (Chan et al. 2006; Phillips

2006; Schiefer and van der Noll 2017), the few existing reviews of *empirical findings* focus on narrower topics, such as trust (Nannestad 2008), the impact of ethnoreligious diversity (van der Meer and Tolsma 2014) or immigration (Cheong et al. 2007). Most importantly, the *measurement* of social cohesion and the *main empirical insights* gained from sophisticated measures of cohesion have not been reviewed so far. The article at hand aims to fill in this gap.

In order to maximize the benefit for an international readership, we focus on *cross-nationally comparative* measures of cohesion that take *entire societies* as their unit of analysis. Consequently, we do *not* cover the various measures used in single-country studies, such as for Hong Kong (Chan and Chan 2006), South Africa (Njozela et al. 2018), or the Netherlands (Schmeets and te Riele 2014), to name just three examples. Nor do we consider research that uses regions or cities as the unit of analysis, even if these units have been compared across countries (e.g., Mannarini et al. 2018). We review measures that are aimed at assessing social cohesion for a larger number of societies in a way that reflects the multifaceted nature of cohesion, i.e., considering different attributes. This aspiration sets them apart from the abundance of cross-national research that focusses on a single component of social cohesion such as interpersonal trust (Delhey and Newton 2005; Larsen 2013, 2014), identification (Cheung et al. 2014), or conflict perception (Delhey and Keck 2008), of which some, but by no means all, refer to social cohesion as the overarching concept.[1] We further exclude measures that define cohesion merely *ex negative* in terms of absence of discrimination, conflict, and violence, as the *Intergroup Cohesion Index* does, a social development indicator established by the World Bank (Foa and Tanner 2012). Finally, given that most scholars conceive of cohesion as a quality of a collective, we do not consider measures that conceptualize cohesion as an attribute of individuals (e.g., the measure by Vergolini 2011).

The review is organized as follows. Section 2 briefly contrasts measures of social cohesion with measures of social progress and, more generally, quality of life, and describes what can be considered an emerging consensus about the nature of cohesion among social scientists. Section 3 portrays five cohesion measures: The *Bertelsmann Social Cohesion Radar* (Dragolov et al. 2016), the *Afrobarometer Social Cohesion Index* (Langer et al. 2017), the *VALCOS Index* (Dickes and Valentova 2013; Dickes et al. 2010), the *WVS Cohesion Dimensions* (Janmaat 2011), and the *Cohesion Regimes Components* (Green et al. 2009).[2] Adopting the evaluation framework of Munck and Verkuilen (2002), we compare and evaluate these instruments with regard to their main purpose, what they measure, and how. Section 4 highlights some empirical insights gained by the measures, touching upon the issues of cohe-

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[1] Unidimensional measures of social cohesion are beyond the scope of this review.

[2] With the exception of the *Social Cohesion Radar* and the *VALCOS Index* (which stands for VALeurs et Cohésion Sociale), the labels attached to the other measures are ours. For the *VALCOS Index* (Dickes and Valentova 2013), we took the liberty to extend the label backward to their study from 2010. Langer et al. (2017) speak of the Social Cohesion Index (SCI); we extended the label to "*Afrobarometer SCI*" to denote the continental scope and database used. Finally, Green et al. (2009) and Janmaat (2011) did not attach a label to their measurement instrument. We labelled Janmaat's measure *WVS Cohesion Dimensions* to denote the survey project utilized, the World Values Survey.

sion levels, cohesion regimes, as well as macro-level determinants and outcomes. The final section offers conclusions and points out the necessary next steps.

2 Social Cohesion as a Specific Quality of Collectivities

Social cohesion denotes a specific quality of the societal community other than—yet, not necessarily independent of—economic wealth, material living conditions and socio-economic progress. This specific "social" quality of societies is commonly described with terms such as solidarity, togetherness, and we-feeling. Above, we deliberately chose Talcott Parsons' term "societal community" (Parsons 1966), as his famous AGIL schema (Adaptation, Goal attainment, Integration, Latency) helps to situate cohesion as relating to how socially integrated societies are. The function of integration is assigned to the sub-system societal community, whereas the economic, political, and cultural subsystems fulfill other functions. This allocation suggests sparing aspects such as economic prosperity and its distribution, political rights and liberties, as well as the degree of value consensus from conceptualizing cohesion. The cohesion concept is analytically most powerful if limited to how well fellow citizens—and the various groups society is composed of—relate to each other, to major societal institutions, and to the common good (Dragolov et al. 2016).

Cohesion bears conceptual similarities with *social capital* (Putnam 1995) and, in fact, shares some key indicators, such as social trust. However, the conceptual scope of cohesion is much broader in that it encompasses attributes that researchers would typically regard as consequences of social capital, such as the acceptance of political institutions or low crime rates. Moreover, unlike social capital, cohesion cannot be meaningfully attributed to individuals. Cohesion is at the same time narrower than another related concept, the *social quality* approach. Originating in the mid-1990s as a reaction to the over-emphasis of economic issues in European policy making (Walker and Van der Maesen 2004), the social quality initiative considers social cohesion, but also social empowerment, social inclusion, and socio-economic security, as cornerstones of a decent society (Abbott et al. 2016). Social cohesion research, therefore, is concerned with just one of these cornerstones.

Despite diverging opinions on how cohesion should be defined concretely, consensus has emerged on the following aspects (Dickes and Valentova 2013; Dragolov et al. 2016; Schiefer and van der Noll 2017):

- Cohesion is a quality of a *collectivity* of people; social groups and large aggregates of people can be cohesive, but not individuals.
- Cohesion is a *gradual* phenomenon; collectivities can be more or less cohesive.
- Cohesion is a *multifaceted* concept that cannot be fully grasped by looking at single attributes.
- Cohesion consists of *ideational, structural-relational*, and *behavioral* aspects. Some add *distributive* aspects, too (Berger-Schmitt 2002), whereas others argue that this blurs the lines to other welfare concepts (see Schiefer and van der Noll 2017).

● Cohesion research should focus on *outcomes* (e.g., how well different ethnic groups arrange their living together) rather than *inputs* (e.g., the ethnic hetero-geneity of a population).

Our selection criteria for this review—internationally comparative measures that analyze cohesion as a multifaceted phenomenon of society at large—leave us with five instruments that follow different purposes and analytical strategies. Three of them, the *Afrobarometer Social Cohesion Index*, the *Bertelsmann Social Cohesion Radar*, and the *VALCOS Index,* follow an *index approach*. Various indicators are summarized into, ideally, one single composite index or several composite indices, which can then be used to compare countries and to analyze causes and consequences of varying levels of cohesion. These measures have a close proximity to welfare re-search with its goal to monitor social change and progress (Noll and Zapf 1994). In contrast, the *Cohesion Regimes Components* and the *WVS Cohesion Dimensions* follow a *dashboard approach.* These are sets of indicators that are typically analyzed in their totality, driven by the typological interest in detecting so-called "regimes of cohesion" (Green et al. 2009; Janmaat 2011). Inspired by the rich literature on wel-fare state regimes (Esping-Andersen 1990), the key idea behind cohesion regimes is that historically, countries have developed different pathways toward institution-alizing solidarity; consequently, families of nations sharing certain peculiarities in social cohesion are expected to exist and can, therefore, be characterized by specific combinations of high or low levels on the various attributes of cohesion (see Green et al. 2009).

3 Cross-National Measures of Social Cohesion: a Comparative Assessment

3.1 The Measures in a Nutshell

The main analytical purpose of the *Afrobarometer SCI* (Langer et al. 2017) is to explore whether low levels of cohesion fan the flames of ethnic conflicts and intra-state battles. To this end, the index creators summarize a relatively small number of five indicators exclusively taken from the Afrobarometer survey series into an overall index, described as a "perception-based index" (Langer et al. 2017, p. 328). Content-wise, the index focusses on the relations within and between ethnic groups, as African societies are primarily segmented along ethnic lines. The approach assessed social cohesion for 17 countries and three points in time: 2005, 2008, and 2012.

The *Social Cohesion Radar* is a social reporting initiative launched by Bertels-mann Stiftung a decade ago (Bertelsmann Stiftung 2013, 2018; Dragolov et al. 2016). The *Radar* summarizes a large number of indicators from international sur-veys and official statistics in three steps: nine sub-domain indices (step 1), three domain indices (step 2), and an overall cohesion index (step 3). Building on the same concept and analytical framework but using partly different sets of indicators to accommodate for cultural differences, the *Social Cohesion Radar* is available for 34 Western countries, covering four periods between 1989 and 2012 with 58 indi-

cators (Dragolov et al. 2016); and for 22 Asian countries, covering the two periods 2004–2008 and 2009–2015 with 36 indicators (Bertelsmann-Stiftung 2018). The *Radar* can be used to measure the strength of social cohesion overall (final index) or its constitutive aspects separately (domains and sub-domains), to investigate their determinants and outcomes as well as to explore cohesion regimes, that is, specific national profiles of cohesion.

The *VALCOS Index* (Dickes and Valentova 2013; Dickes et al. 2010) informs about the level of social cohesion in European countries, based exclusively on the European Value Study. The analysis was undertaken twice so far, for 33 (Dickes et al. 2010) and 47 (Dickes and Valentova 2013) European countries respectively, the number of countries that took part in the available waves of the European Values Study. Via so-called intermediate variables, the *VALCOS Index* collapses a large number of items (44–EVS 1999; 49–EVS 2008) into 12 (EVS 1999) respectively 13 (EVS 2008) sub-domains and then subsumes these sub-domains into two domain indices labeled formal and substantial cohesion. As an elaborate individual-level dimensionality test provided evidence for these two broader cohesion dimensions, no overall cohesion index is constructed. The core publications of the VALCOS team provide information on levels of cohesion in Europe, sub-divided into the macro-regions North, South, West, East, Former Soviet Union, and Turkey. Scores for individual countries were only reported for the older *VALCOS Index* from 1999.

The *WVS Social Cohesion Dimensions* (Janmaat 2011) primarily constitute an indicator set for identifying cohesion regimes. Based on 14 indicators mainly taken from the World Values Survey, 16 countries were cluster analyzed. A secondary purpose, however, is to offer an exploratory analysis of the dimensional structure behind the 14 cohesion indicators. This additional analysis was performed for a set of 41 countries that took part in the WVS 1999–2004, yielding two major cohesion dimensions. Consequently, these two dimensions were not collapsed into an overall index but analyzed separately, e.g. with respect to their association with economic development.

The *Cohesion Regime Components* (Green et al. 2009) is driven by the typological interest in identifying cohesion regimes. Some 20 indicators were assembled to represent 16 sub-dimensions ("components") of cohesion, which were analyzed in their totality. Based on an extensive literature review, the index creators hypothesized that five distinct regimes exist, labeled "Liberal," "Social democratic," "Social market," "(Residual) Romanic conservative," and "East Asian." As presumptive representatives of these regimes, 32 countries were subjected to cluster analysis.

Table 1 presents an overview of the type, composition, spatial and time scope as well as analytical procedure of the five measures compared in this review.

The subsequent sections systematically compare the measures with respect to conceptualization (coherence and specification) and measurement (indicators, sources and information reduction), our core evaluation criteria. Additional criteria include the measures' accessibility of country scores and comprehensibility. Our comparison draws on the widely cited framework of Munck and Verkuilen (2002) for evaluating democracy measures, which we adapted for our purpose.

Table 1 A fact sheet of cohesion measures

	Social Cohesion Radar	Afrobarometer SCI	VALCOS Index	WVS Cohesion Dimensions	Cohesion Regimes Components
Type of measure	Composite index	Composite index	Two composite indices	Indicator set +two indices (factor scores)	Indicator set (no index)
Number of indicators/sub-domains/domains	Western Radar: 58/9/3 Asian Radar: 36/9/3	5/5/3	VALCOS 1999: 44/12[a]/4/2 VALCOS-2008: 49/13[a]/4/2	14/8/2	19/15/=
Spatial scope (number of countries)	Western Radar: EU + Western OECD (34) Asian Radar: South, Southeast, and East Asia (22)	Africa (19)	VALCOS 1999: Europe (33) VALCOS 2008: Europe (47)	Indicator set: Europe + USA, Canada + Japan, South Korea (16) Factor scores: Worldwide (41)	Europe + Western OECD + Japan, South Korea (32)
Year/time periods covered	Western Radar: 1989–1995 1996–2003 2004–2008 2009–2012 Asian Radar: 2004–2008 2009–2015	2004–2008 2009–2015	1999[b] 2008[b]	Indicator set: 1981–1984 1989–1993 1999–2004 Factor scores: 1999–2004	Around 2000
Procedure of index construction	Combined reflective-formative	Formative	Combined reflective-formative	Reflective	(No index)

[a]The *VALCOS Index* uses so-called intermediate variables as an intermediate step of aggregation between indicators and sub-domains

[b]Not comparable owing to different indicators used

3.2 What is Measured? Issues of Conceptualization

3.2.1 Conceptual Coherence

Whereas it does make little sense to ask which underlying definition of cohesion is "correct," it is worthwhile examining how well the measures adhere to the definitions chosen by the respective authors as their starting point.

The *Social Cohesion Radar* formulated its own conceptual framework of cohesion, based on a comprehensive literature review (Schiefer and van der Noll 2017; Schiefer et al. 2012): "A cohesive society is characterized by resilient social relationships, a positive emotional connectedness between its members and the community, and a pronounced focus on the common good" (Dragolov et al. 2016, p. 6). The three domains mentioned in this definition each unfolds further into sub-domains (nine so-called "dimensions" in total). The domain of *social relations* encompasses horizontal linkages among individuals and groups in society, referring to (1) the strength of social networks, (2) the level of generalized interpersonal trust, and (3) the extent to which different lifestyles are accepted. *Connectedness*, the second domain, emphasizes the vertical relations between individuals and the larger society. This domain encompasses (4) identification with the social entity, (5) institutional trust, and (6) the perception of fairness of society. The third domain, *focus on the common good*, incorporates behaviors and behavioral dispositions related to (7) solidarity and responsibility for others, (8) respect for social rules, and (9) community engagement.

The *VALCOS Index* has a clearly defined starting point, namely Bernard's (1999) tripartite concept, which differentiates among a socio-cultural, political, and economic domain; each domain further encompasses an attitudinal (called "formal") and behavioral ("substantial") component, hence six sub-domains in total. This theoretical concept, however, was not fully implemented, as the economic domain was not considered due to both missing data and the reference to theoretical objections expressed by other scholars such as Chan et al. (2006)—which begs the question why Bernard's definition had been chosen as the starting point in the first place. The remaining four sub-domains were slightly re-formulated (e.g., "political legitimacy" into "institutional trust"), which may suggest that the sub-domains finally arrived at are less complex than Bernard's original concept.

The conceptual approach of the *Afrobarometer SCI* can be characterized as pragmatic, as it does not take a *particular* cohesion definition as a point of departure. Rather, drawing on Hooghe (2012), the index creators consider two broad "traditions": a European tradition that emphasizes structural features such as exclusion, inequalities, and marginalization, and a North American tradition that emphasizes relational qualities among members of society such as social capital, shared understandings, and solidarity (Langer et al. 2017, pp. 324, 325). From this compilation, the index creators select three features/qualities, forming what the authors call the "cohesion triangle" (Langer et al. 2017, p. 327) of inequality, trust, and identities. It remains unclear why *exactly these three* domains were chosen, and not others. In the next step, five items/sub-domains were pragmatically assigned to these three domains.

The *WVS Cohesion Dimensions* can be described as *eclectic*, as this measure combines no fewer than four concepts: the definitions developed by Chan et al. (2006), the Council of Europe (2005), Forrest and Kearns (2001) and Green et al. (2003). After parallelizing these concepts along the basic distinction between ideational and relational aspects of cohesion (see Moody and White 2003), the authors incorporated all the sub-domains mentioned in these concepts. The advantage is the conceptual breadth achieved. A disadvantage, however, is the lack of an unambiguous theo-

Table 2 Attributes of cohesion covered by the measures

Sub-Domains	Social Cohesion Radar	Afrobarometer SCI	VALCOS Index (2008 version)	WVS Cohesion Dimensions	Cohesion Regimes Components
Social networks	✓	–	✓	–	–
Social trust	✓	✓	–	✓	–
Acceptance of diversity/tolerance	✓	–	–	✓	✓
Identification/sense of belonging	✓	✓	–	✓	(✓)
Institutional trust	✓	✓	✓	✓	–
Perception of fairness	✓	✓	–	–	–
Solidarity and helpfulness	✓	–	✓	–	–
Rule conformity/social order	✓	–	–	✓	✓
Civic participation	✓	–	✓	✓	✓
Equality of conditions	–	✓	–	✓	✓
Common values	–	–	–	✓	✓
Ethno-racial diversity	–	–	–	–	✓
Wage regulation[a]	–	–	–	–	✓
Employment protection[a]	–	–	–	–	✓
State involvement[a]	–	–	–	–	✓
Welfare State[a]	–	–	–	–	✓
Social hierarchy	–	–	–	–	✓
Gender equality	–	–	–	–	✓
Freedom vs equality	–	–	–	–	✓
Merit vs equality	–	–	–	–	✓

Please note: The wording of the sub-domains was streamlined to emphasize commonalities instead of minor differences among the measures

✓ included in the cohesion measure

[a]Sub-domains referring to institutional-structural aspects such as social policies and welfare state regulations

retical concept, particularly as the definition put forward by the Council of Europe represents, at best, a minority position in the field.

Finally, the *Cohesion Regimes Components* are described as derived from a commonsensical and "slim" definition of cohesion, the one by Chan et al. (2006). In their theory section, the index creators clearly separate constitutive elements of cohesion from societal institutions that are assumed to be pre-requisites for a cohesive society (Green et al. 2009, p. 8). This useful distinction, however, becomes blurred in the empirical implementation, where attributes and pre-requisites all come in as "components" of social cohesion. As a consequence, quite a broad understanding of cohesion characterizes this approach, which is far from its chosen starting point, the definition by Chan et al. (2006).

3.2.2 Concept Specification

The second conceptual issue concerns the identification of the "leaves of the concept tree" (Munck and Verkuilen 2002, p. 13), in other words: the attributes to be covered. Two dangers lurk: the inclusion of theoretically irrelevant attributes and the exclusion of relevant attributes (see Munck and Verkuilen 2002; Tab. 2). Table 2 documents concrete attributes of cohesion that the measures cover at the sub-domain level, ranging from a maximum of 15[3] to a minimum of four. At the upper end, the *Cohesion Regimes Components* stretches the conceptual scope to the extreme by embracing a number of "inputs" such as social policies and welfare state regulations that were not considered by any of the other measures. This approach, therefore, runs the risk of including theoretically irrelevant attributes. Even if one disregards these inputs (denoted by the [a] in Tab. 2), the remaining attributes still have little overlap with those involved in the other measures. Moving on to the more minimalist approaches, both the *Afrobarometer SCI* (with five attributes) and the *VALCOS Index* (three attributes) arguably have some voids, e.g., "acceptance of diversity" and "rule conformity"; there is the risk of excluding theoretically relevant attributes. The remaining two measures, the *Social Cohesion Radar* and the *WVS Cohesion Dimensions*, are most customary and, thereby, minimize both risks discussed in this section.

3.3 How is Cohesion Measured? Issues of Measurement

3.3.1 Multiple Indicators and Sources

Following Munck and Verkuilen (2002), the use of both multiple indicators (criterion 1) and multiple sources (criterion 2) is preferable over single indicators and single sources, as this prevents potential biases involved in one indicator or one source. Going beyond the consideration of Munck and Verkuilen, we argue that the use of multiple indicators makes it possible to measure the phenomenon at stake more broadly by covering multiple aspects rather than just one. This, in turn, increases the content validity of the measurement instrument. Items from the various

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[3] Sixteen, if one considers the *Cohesion Regimes Components'* split into active and passive participation.

cross-national comparative survey projects are the most often used indicator type, and indispensable for measuring social cohesion. For example, information on trust or feelings of belonging can hardly be collected other than with population surveys. Still, social cohesion encompasses features of a social fact in the Durkheimian sense, as it arguably precedes the social consciousness of the members of society and need not be fully represented in it. Therefore, going beyond population surveys—e.g., via incorporating pertinent administrative data or expert ratings as selected additions to the standard survey indicators—can nuance the measurement and hence be considered a strength (criterion 3).

Only the *Social Cohesion Radar* meets all three quality criteria. Each of the *Radar's* nine sub-domains of cohesion draws on at least three indicators (criterion 1), two survey indicators from different international survey projects (criterion 2), and one non-survey indicator, e.g., administrative data or expert ratings (criterion 3). Second-best is the *Cohesion Regimes Components.* This instrument uses survey indicators from different sources (meeting criterion 2) as well as administrative data (meeting criterion 3), yet not multiple indicators per sub-domain. The *WVS Cohesion Dimensions* partly meet criterion 1 (as the measurement of only 4 of the 8 sub-domains draws on more than one indicator) as well as criterion 3 (2 out of 14 indicators are nonsurvey data). All survey indicators stem from one single source. The *VALCOS Index* fully meets criterion 1, as each sub-domain summarizes a minimum of two and a maximum of four indicators (these intermediate variables are themselves represented by two to six items). Otherwise, the approach of the *VALCOS index* uses only survey indicators from one single survey project, the EVS. The latter characteristics are shared by the *Afrobarometer SCI.* In addition, whereas the measurement of two domains rests on two indicators each, the third domain of the *Afrobarometer SCI* draws on just one indicator, so that criterion 1 is only partially met.

3.3.2 Information Reduction

Another methodological issue concerns how the measures move from the lowest level of abstraction (concrete indicators, that is, items) to higher ones (scores for sub-domains/domains and the overall index). Does the reduction of information, if any is aspired to, rest on empirical examination such as factor analysis? Such a reflective logic counts as the soundest solution. Or were indicators merged merely on the basis of theoretical considerations, adopting a formative logic (see Maggino and Zumbo 2012)?

For the *WVS Cohesion Dimensions*, the 14 items used were selected on theoretical grounds and were then analyzed as (a) a set of items in search of cohesion regimes (following a dashboard approach, without empirical checks), and (b) subjected to an exploratory factor analysis at the country level. The latter—reflective—procedure yields two dimensions (domains) of cohesion, "solidarity" and "participation," which correlate positively but weakly across the 41 countries covered. Consequently, no overall index is formed.

The *Social Cohesion Radar* is characterized by a hybrid reflective-formative approach at the country level, as exemplified in Fig. 1. The indices for the nine
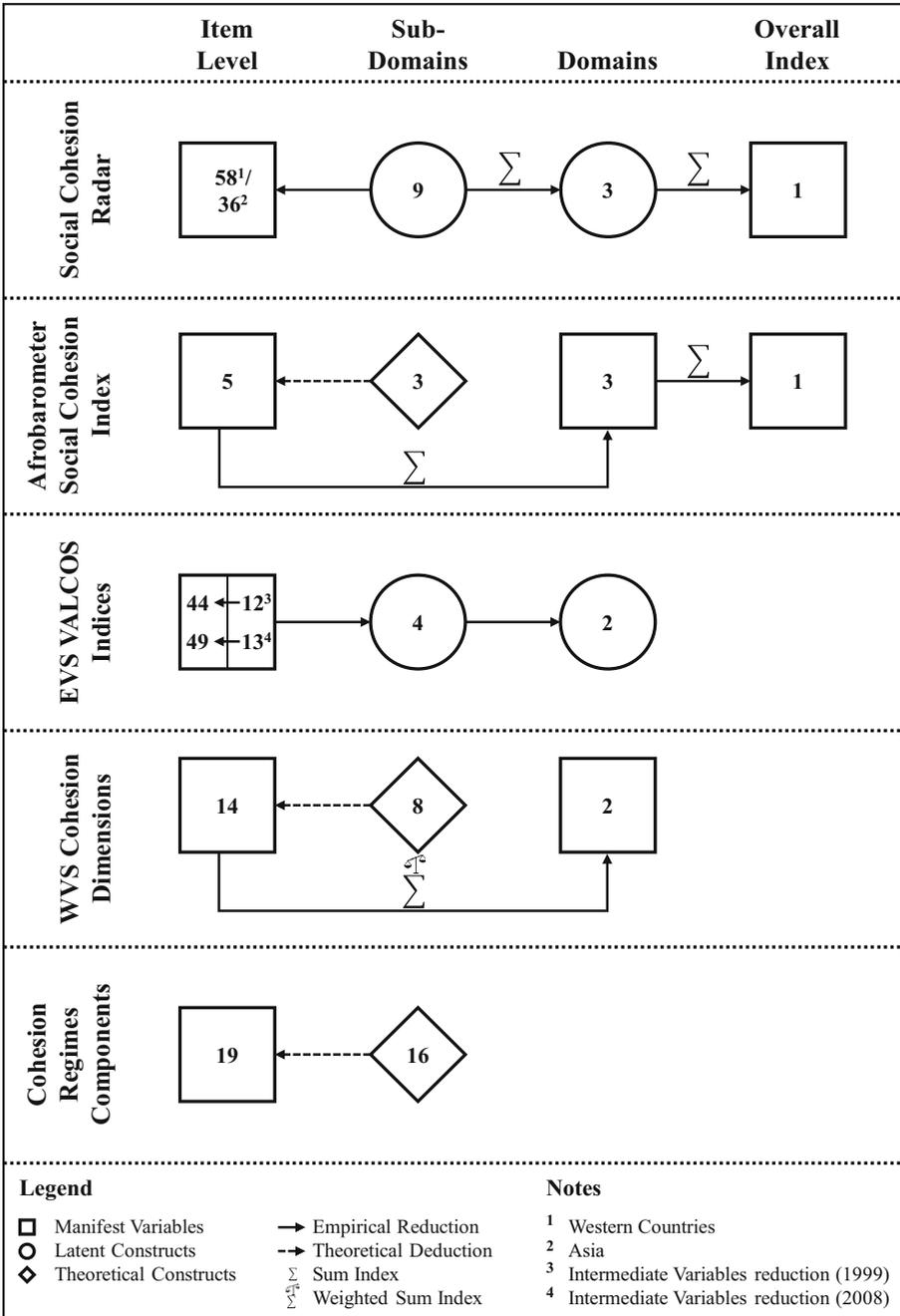
Fig. 1 Methodologies of the five cohesion measures

cohesion sub-domains as listed in Tab. 2 follow a reflective logic: the sub-domains are treated as latent constructs manifesting themselves in the respective indicators, which requires that the indicators exhibit sufficiently strong empirical associations with the respective sub-domain. The three superordinate domains "social relations," "connectedness," and "focus on the common good," as well as the overall cohesion index, follow in contrast a formative logic: each domain is a composite index of its respective sub-domains, and the overall index is a composite of the three domains (Dragolov et al. 2016, Ch. 2). Although the formative index-building approach does not require any empirical justification beyond the theoretical considerations, a factor analysis conducted with the nine cohesion sub-domains suggests that a unidimensional solution might represent the data sufficiently well (Dragolov et al. 2016, Ch. 4).

The *VALCOS Index* likewise uses a hybrid reflective-formative approach. Here, the intermediate variables—which "sit" between the single indicators and the four cohesion sub-dimensions—follow a reflective logic, whereas the four cohesion sub-dimensions and the two superordinate cohesion dimensions follow a formative logic: each sub-dimension ("institutional trust," "solidarity," "political participation," and "sociocultural participation") is a composite index of its respective intermediate variables, and the two superordinate dimensions of "formal cohesion" and "substantial cohesion" are a composite of two sub-dimensions each (Dickes and Valentova 2013, p. 838). This hybrid index formation is empirically supported by a confirmatory factor analysis at the individual level, including the proof of cross-country measurement equivalence for the greater share of the countries studied. As no overarching factor emerged, the authors conclude that "measuring social cohesion with one single composite indicator is not possible" (Dickes and Valentova 2013, p. 836). Whereas the empirical rigor is to be commended, the level question arises, as social cohesion ultimately is not an attitudinal construct within individuals—structural measurement characteristics of social cohesion, therefore, need to emerge on the aggregate level (e.g., countries), not the individual level.

The *Afrobarometer SCI* is a formative composite index (see Fig. 1): five items were selected on theoretical grounds and summarized into three domain indices (for "inequality," "trust," and "identity") without empirical checks. These domains were then further summarized into the overall index—although a correlation analysis demonstrates that the domains hardly correlate with each other, the exception being "identity" and "inequality" (see Langer et al. 2017; Tab. 2).

Finally, the *Cohesion Regimes Components* keep all indicators strictly separate, as this measure does not pursue the goal of indexing social cohesion. Instead, the countries were cluster analyzed based on (a) all indicators, (b) the subsets of administrative indicators, and (c) the subset of opinion survey indicators.

3.4 Additional Criteria

3.4.1 Accessibility

A first additional aspect is the documentation and accessibility of cohesion scores at various levels of aggregation, which is important for the scientific community

for replication studies or for re-using the scores otherwise. The *Social Cohesion Radar* as well as the *Afrobarometer SCI* are the two measures that have published scores—for overall cohesion, as well as for (sub-)domains—for all countries and all time periods covered (see Dragolov et al. 2016 for the Western Social Cohesion Radar, Dragolov et al. 2018 for the Asian Social Cohesion Radar, and Langer et al. 2017 for the Afrobarometer SCI); for the Social Cohesion Radar, scores can additionally be downloaded from the Bertelsmann Stiftung homepage. For the *WVS Cohesion Dimensions*, country scores can only be eyeballed from scatterplots, for the *VALCOS Index* from bar charts (only for European macro-regions, not individual countries).

3.4.2 Comprehensibility

A final criterion is ease of interpretation of the cohesion scores generated, which is an issue especially for the dissemination of findings to the general public. Only the *Afrobarometer SCI* allows the interpretation of absolute scores, an advantage stemming from the simple formative logic of index construction. The remaining measures allow a relative interpretation of scores only, that is in comparison to the other countries studied.

3.5 Summary Assessment

Table 3 summarizes how the cohesion measures fare against the set of evaluation criteria. Considering the core criteria of conceptualization and measurement, the best performing measure is the *Social Cohesion Radar*, which is advantageous over the other measures in terms of conceptualization and measurement. The *WVS Cohesion Dimensions* perform second-best, though already with some distance, whereas the remaining measures have specific strengths and weaknesses. A further plus of the *Social Cohesion Radar* is that country scores are easy to retrieve for re-use; only the *Afrobarometer SCI* is comparably good in this respect. From the two indicator sets reviewed, the *WVS Cohesion Dimensions* are more customary and hence preferable over the *Cohesion Regime Components*; still, the *Social Cohesion Radar* can also be used—and has been used—for the specific purpose of identifying regimes of cohesion.

4 What Do We Know About Social Cohesion? Key Findings

We move on to key empirical insights gained from the various cohesion measures. This part of the review covers the topics country/macro-regional rankings, cohesion regimes, determinants of cohesion, and outcomes. Table 4 gives an overview of the topics addressed so far with the various cohesion measures, and the themes that can be addressed in principle. As the *Social Cohesion Radar* has been used most extensively and has, thus, generated a much greater stock of findings than the other measures, this part of the review draws heavily on the publications related to the various *Social Cohesion Radar* projects.

Table 3 Evaluation of cohesion measures—summary table

Criteria	Social Cohesion Radar	Afro-barometer SCI	EVS VALCOS Indices	WVS Cohesion Dimensions	Cohesion Regime Components
Conceptualization					
Conceptual coherence	✔	(✔)	(✔)	(✔)	X
Concept specification	✔	(✔)	(✔)	✔	X
Measurement					
Multiple indicators per dimension	✔	(✔)	✔	(✔)	X
Multiple sources for survey indicators	✔	X	X	✔	✔
Survey and nonsurvey indicators	✔	X	X	(✔)	✔
Information reduction on empirical grounds	(✔)	X	✔	✔	n. a.
Proper level of aggregation/analysis	✔	✔	(✔)	✔	✔
Additional criteria					
Availability of country scores	✔	(✔)	(✔)	X	X
Comprehensibility	(✔)	✔	(✔)	(✔)	n. a.

✔ met, *(*✔*)* partially met, *X* not met, *n. a.* not applicable

4.1 Which Societies Are More or Less Cohesive?

How countries rank in terms of social cohesion can be answered most reliably for the world regions separately (see the area maps, Figs. 2, 3 and 4). Starting with Europe, the Western *Social Cohesion Radar* (Dragolov et al. 2016, Ch. 3) ranks four Scandinavian countries on top, with Denmark in the lead. Scandinavia is followed by affluent Western European countries, among them Switzerland, Luxembourg, Austria, and Germany. The remaining Western European countries, including France and the UK, score medium-high on the cohesion index, whereas countries from Southern Europe (e.g., Italy and Portugal) and from Central-East Europe (e.g., Poland and Hungary) score medium-low. South-Eastern Europe and two Baltic countries bring up the rear, with Latvia, Bulgaria, Greece, and Romania scoring lowest. The *VAL-COS Indices* largely corroborate that gradients in social cohesion run from Northern to Southern Europe and from Western to Eastern Europe (Dickes and Valentova 2013; Dickes et al. 2010). Broadening the scope to the Western world by adding the English-speaking New World countries, as done in the Western *Social Cohesion Radar*, New Zealand and Australia join the Scandinavian countries in the high-cohesion tier, whereas Canada and the USA find their place in the ranking right before most of the Western European countries.

The league table of the *Asian Social Cohesion Radar* is led by two rich city-states, Hong Kong and Singapore, followed by Thailand, Bhutan, Taiwan, and Sri Lanka (Dragolov et al. 2018). Most Asian countries are characterized by a medium level of

Table 4 Analytical issues addressed by cohesion measures

Topics	Social Cohesion Radar	Afrobarometer SCI	VALCOS Index	WVS Cohesion Dimensions	Cohesion Regime Components
Country rankings	✔	✔	(✔)	(✔)	X
Cohesion regimes	✔	=	=	✔	✔
Determinants	✔	=	=	(✔)	(✔)
Outcomes	✔	(✔)	=	=	X

✔ broadly addressed, *(✔)* selectively addressed, = not addressed, yet possible in principle, *X* impossible to address

cohesion, e.g., Japan, China, South Korea, and Indonesia. India, Nepal, Bangladesh, and Pakistan, all located in South Asia, exhibit a low level of cohesion. Finally, Afghanistan, a state devastated by a series of wars since the 1970s, ranks as least cohesive in this Asian comparison.

The *Afrobarometer SCI* (Langer et al. 2017) lists Senegal as the most cohesive country in Africa (of 19 countries examined), followed by a large group of 13 countries with a medium-strong cohesion level. Kenya, Liberia, and Botswana score as less cohesive, whereas Uganda and especially Nigeria rank as least cohesive, which coincides with the World Bank's Inter-Group Cohesion Index (Foa and Tanner 2012). Still, there are a number of white spots in Africa, as Fig. 4 shows.

It is difficult to tell from these separate rankings which countries are the most and least cohesive *worldwide.* The *WVS Cohesion Dimensions* (Janmaat 2011) is the only measure covering countries from all major world regions in one go. Seeing scores for its two cohesion dimensions in conjunction (recall that this measure does not provide an overall index) suggests that the Scandinavian countries are most
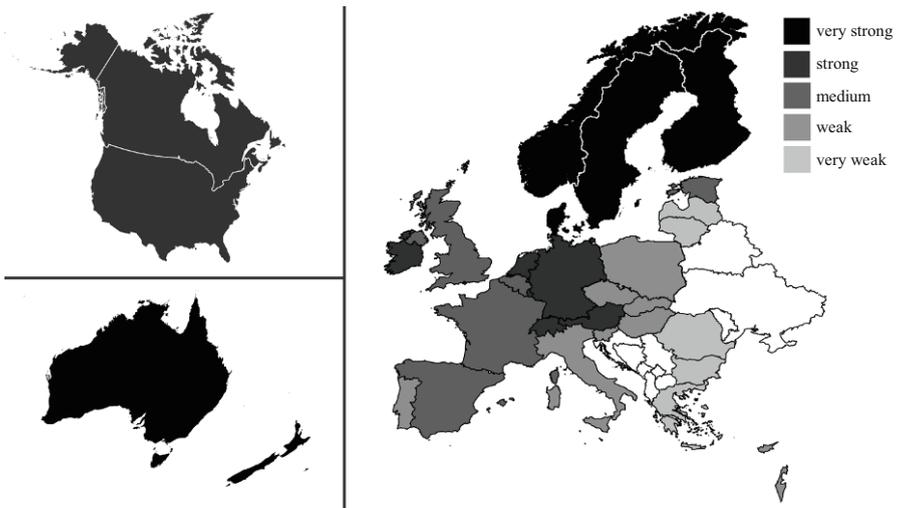

Fig. 2 Level of social cohesion in Western countries (Western Social Cohesion Radar)
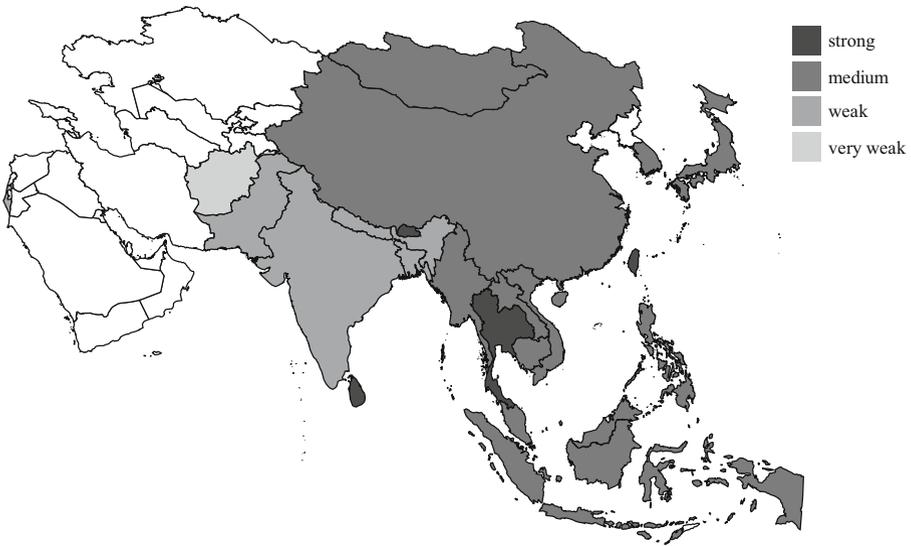
Fig. 3 Level of social cohesion in Asian countries (Asian Social Cohesion Radar)

and the Soviet Union successor states least cohesive. Still, the set of 41 countries cannot cover all corners of the world, and the data refer to 1999–2004, just a decade after the rocky disintegration of the Soviet Union. The more recent World Bank's Inter-Group Cohesion Index (recall: this index measures cohesion ex negativo) lists Pakistan, Cote d'Ivoire, Nigeria, and Sudan at the bottom of the global ranking (Foa and Tanner 2012), suggesting that the least cohesive societies might be located in South Asia and Africa, not in Eastern Europe and Central Asia.

4.2 Are There "Regimes of Cohesion"?

Do distinct regimes of cohesion exist, understood as groups of countries with typical profiles of strengths and weaknesses on the various (sub-)domains of cohesion? Based on the *Cohesion Regime Components*, Green et al. (2009, Sect. 6) answer this question affirmatively, distinguishing among a "Liberal anglophone," "Conservative Continental," "Social-democratic Scandinavian," and "East Asian" regime. As already discussed, this measure stretches the concept of cohesion to include institutional welfare state characteristics (see Tab. 2), and indeed the different cohesion regimes emerge most clearly when only these institutional indicators are used for clustering countries. In contrast, the remaining attitudinal indicators—which measure social cohesion more narrowly defined—produce "a less perfect clustering of countries" (Green et al. 2009, p. 119). This latter finding is corroborated by the *WVS Cohesion Dimensions*. Based on a less sizable—and mostly attitudinal—set of indicators, the cluster analysis with WVS data "provides only partial support for the 'stable regimes of social cohesion' hypothesis" (Janmaat 2011, p. 79).

In the *Social Cohesion Radar*, the cluster analyses performed render groupings along a relatively clear geographical-cultural pattern of countries scoring high,

Fig. 4 Level of social cohesion in African countries (Afrobarometer Social Cohesion Index)
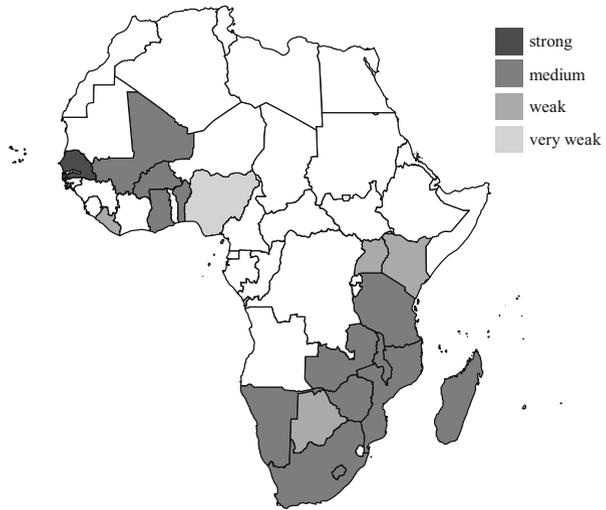
medium or low across *most* cohesion sub-domains. These are—in this order of declining cohesion—the Nordic, English-speaking, Northwestern European, Mediterranean, Eastern European, Levantine, and Southeastern European clusters in the Western comparison (Dragolov et al. 2016, Ch. 4); and the Sinosphere, members of ASEAN (Association of Southeast Asian Nations) and members of SAARC (South Asian Association for Regional Cooperation) in the Asian comparison (Dragolov et al. 2018). The country clusters indeed reflect distinct regimes with characteristic patterns along the sub-domains, which in turn results in different *levels* of cohesion across the regimes. Likewise, the *VALCOS Indices* produce quite a consistent ranking of European macro-regions on all its four sub-domains—respectively two domains—of cohesion (Dickes and Valentova 2013; Dickes et al. 2010). For example, the Nordic countries score best on *all* four sub-domains, whereas the former Soviet Union countries score worst on three of four.

Taken together, the state of research suggests, in our reading, that the expectation of clear-cut cohesion regimes is born out in the data rudimentarily at best. Only when information on social policies and institutional arrangements are considered *in addition to* social cohesion indicators can cohesion regimes be identified. This strategy, however, has its price: conceptual overstretch.

4.3 Determinants: What is Good for Cohesion, What is Bad?

Correlates of social cohesion have been most comprehensively studied with the *Social Cohesion Radar* for the West (Dragolov et al. 2016, Ch. 5), for Asia (Dragolov et al. 2018), and in a Western–Asian comparison (Delhey et al. 2018). These analyses made use of a time-lagged approach, correlating societal conditions at one point in time with social cohesion a few years later. The most robust and sociologically interesting findings concern affluence, inequality, value climates, and ethnic heterogeneity (societal characteristics that are not constitutive elements of cohesion in the

Social Cohesion Radar framework; the same holds true for welfare state characteristics).

4.3.1 Affluence

One clear message is that bonds of cohesion are stronger in more affluent countries. Strong and positive associations have been found for the two sets of Western ($r = 0.75$) and Asian ($r = 0.63$) countries (Delhey et al. 2018). When breaking up the overall *Social Cohesion Radar* index into its components, economic prosperity is strongly associated with all nine sub-domains, except for "national identification" (Dragolov et al. 2016, Ch. 5.2). In regression analysis with several country characteristics, affluence remains the most important determinant. The importance of affluence is corroborated by the *WVS Cohesion Dimensions*: both "solidarity" at $r = 0.66$ and "participation" at $r = 0.42$ are associated with economic prosperity (Janmaat 2011).

4.3.2 Inequality

A hotly debated and supposedly corrosive condition is income inequality (Wilkinson and Pickett 2010; Delhey and Steckermeier 2020). In line with the inequality-hypothesis, the Western *Social Cohesion Radar* found bonds of cohesion to be systematically weaker in economically more unequal countries (Dragolov et al. 2016: Ch. 5; Delhey et al. 2018). The corrosive impact of inequality, however, is weaker than the conducive impact of prosperity, and concerns fewer sub-dimensions of cohesion (6 out of 9; inequality is unrelated to "acceptance of diversity," "national identification," and "solidarity and helpfulness"). The *Asian Social Cohesion Radar*; however, did not unearth a straightforward *linear* association between the scale of income inequality and cohesiveness across Asian countries (Delhey et al. 2018). Rather, the relationship in Asia is characterized by an inverted U shape: up to a certain point, income inequality seems to be conducive to cohesion, whereas only excessive levels of inequality undermine it. This finding challenges the universal validity of the idea that less income inequality is indisputably better for cohesion.

4.3.3 Value Climates

Across Western countries, societies with more religious populations tend to have lower levels of social cohesion ($r = -0.25$), whereas a postmaterialist value climate is associated with higher cohesion levels ($r = 0.36$) (Dragolov et al. 2016, Ch. 5). This suggests that a more "modern" culture is associated with stronger cohesion. The negative effect of religiosity also emerged for Asian societies (Delhey et al. 2018), whereas the unavailability of data prevented an exploration of the effect of postmaterialist values in this world region. Overall, these findings call into question the expectation that religion and traditional values can still serve as a "social glue" in contemporary societies.

4.3.4 Ethnic and Religious Heterogeneity

The probably most interesting *nonfinding*, both in the Western (Dragolov et al. 2016, Ch. 5) and the Asian *Social Cohesion Radar* (Dragolov et al. 2018), refers to population heterogeneity along ethnic, religious, and linguistic lines: there are no clear-cut patterns suggesting that more heterogeneous societies are necessarily less cohesive (for similar findings on social capital, see Hooghe et al. 2009; Gesthuizen et al. 2009). However, the comparative studies we review here do not reflect the more recent large-scale migration movements, e.g., the European "summer of refugees" of 2015; for the European Union member states there is evidence that citizens perceive stronger tensions between different ethnic and religious groups in countries that have recently had high rates of migration and asylum seekers (Eurofound 2018).

4.4 Consequences: Is Social Cohesion Necessarily a Good Thing?

Is social cohesion a thoroughly valuable state of states that should be maximized? Or does cohesion also have its dark sides (see also Grunow et al. 2023) and hence should rather be optimized? With the *Social Cohesion Radar*, complex questions like these have been approached from a *utilitarian perspective*—the subjective well-being of individuals in terms of happiness and life satisfaction. The *Western Social Cohesion Radar* reveals a very strong positive association between the cohesiveness of societies and average life satisfaction of the population, with correlations within the range from 0.45 to 0.87, depending on the country set, time period, and life satisfaction measure (Delhey et al. 2018; Dragolov et al. 2016). Multilevel analyses conducted for the European Union countries (Delhey and Dragolov 2016; Dragolov et al. 2016, Ch. 6) confirm that people are indeed happier and psychologically healthier when living in more cohesive societies, no matter whether the individuals are resource rich or resource poor. Yet, there is evidence that national prosperity moderates the link between cohesion and subjective well-being, as in the richer Western part of Europe people feel the well-being benefit of social cohesion more strongly and more consistently across the various cohesion domains than people in the less affluent Eastern part. This finding is in line with the idea of a postmaterialization of the happiness recipe in rich societies (Delhey 2010).

In Asia, the well-being effect of cohesion seems to be weaker, as the strong positive bivariate association between cohesion and population life satisfaction is greatly reduced once GDP per capita is controlled for (Delhey et al. 2018). Still, cohesion in Asia is positively and robustly associated with populations' optimism to live a happier life in the near future. For Africa, analyses with the *Afrobarometer SCI* reveal that low social cohesion increases the probability of violent conflict events such as battles and violence against civilians (Langer et al. 2017). Overall, there is strong evidence for cohesion being a "positive" social force that should be maximized. Yet, results from the *Asian Social Cohesion Radar* suggest that cohesion can also aid the stability of authoritarian regimes (Delhey et al. 2018).

5 Discussion and Conclusion

This review has shown that there are two main purposes for developing cross-national comparative measures of social cohesion: to explore the existence of distinct cohesion regimes, driven by a typological interest to classify countries (as in welfare state research); and to evaluate gradual differences in the strength of cohesion, with the goal of ranking countries and analyzing macro-level correlates of cohesion (as in quality-of-life research). The first purpose typically leads researchers to develop sets of indicators and to analyze them holistically, whereas the second purpose leads them to construct composite indices in order to condense information as much as possible. Both approaches have their merits and legitimacy, and even complement one another. We have reviewed two measures, which, entirely or primarily, represent the typology approach, namely the *Cohesion Regimes Components* and the *WVS Cohesion Dimensions*, as well as three measures that primarily represent the index approach: the Bertelsmann *Social Cohesion Radar*, the *VALCOS Index*, and the *Afrobarometer SCI*.

This general difference notwithstanding, our review has demonstrated a considerable overlap with respect to the attributes of cohesion most measures consider. An exceptional case in this regard is the *Cohesion Regimes Components*: though certainly useful for research specifically interested in the *intersection* of cohesion, inequalities, and the welfare state, its unusually broad conceptualization of cohesion, blending inputs and outcomes, renders this measure less suitable for most other purposes and less of a role model for measuring social cohesion.

In order to systematically assess a measure's strengths and weaknesses, we adopted and modified a widely used evaluation framework originally developed for democracy measures (Munck and Verkuilen 2002). Applying this framework, our review has demonstrated that the *Social Cohesion Radar* is advantageous over the other measures. Conceptually, it is both most coherent (as it seamlessly implements one cohesion concept), and most "customary" (as it covers attributes considered relevant by most scholars, without obvious voids). Methodologically, the *Social Cohesion Radar* is unique in employing, for each sub-domain of cohesion, multiple indicators from different survey projects plus other social statistics. In addition, a combined reflective-formative approach at the appropriate—country—level puts the index construction on a sound empirical basis. Last, the *Social Cohesion Radar* is most user friendly, as it offers the possibility of downloading aggregate scores from the Bertelsmann Stiftung homepage (www.social-cohesion.net); data for the years 2013 to 2020 are expected in late 2023.

A final goal of this review was to highlight key findings gained with the comparative cohesion measures. An important insight is that the various measures, although differing in their concrete methodology, produce similar rather than dissimilar country rankings—to the limited extent that such comparisons are possible, which is most likely still the case for Western/European countries. In unison, the various measures see the Scandinavian countries as being most cohesive, and the Eastern European countries as least cohesive. For example, rank correlations between the *Social Cohesion Radar Index* and the *VALCOS Index* are at 0.69 ($p < 0.0001$) for

"formal cohesion," and at 0.57 ($p < 0.001$) for "substantial cohesion."[4] With respect to correlates of social cohesion, the most robust finding is that national affluence is accompanied by stronger, not weaker, bonds of cohesion—a finding that is at odds with prominent theories of social malaise that readily portray affluent societies as "broken" (Elchardus and De Keere 2013; Wilkinson and Pickett 2010). A modern-secular cultural climate of postmaterialism strengthens cohesion, too, whereas economic inequality undermines it, at least in Europe and in the Western world, yet not necessarily in Asia. Population heterogeneity in ethno-cultural terms plays out neutrally. However, caution is warranted when transferring results from international comparisons to single countries or even smaller spatial units such as regions or cities. The impact of population heterogeneity is a case in point, as negative effects on cohesion surface more often at the local than at the national level (van der Meer and Tolsma 2014). A robust finding across various spatial levels is the positive well-being effect of social cohesion: all studies that explicitly researched this relationship consistently found that living in more cohesive societies boosts human happiness (Delhey and Dragolov 2016; Dragolov et al. 2016, Ch. 5 and 7, 2019; Arant et al. 2017).

The review of findings has demonstrated that the *Social Cohesion Radar* has produced the richest cross-national findings. Moreover, its concept and methodology have also been applied to Germany at the federal state level (Dragolov et al. 2016, Ch. 7), regional level (Arant et al. 2017; Dragolov et al. 2019; Follmer et al. 2020; Boehnke et al. 2022), and neighborhood level (Arant et al. 2016). To the best of our knowledge, this application of one and the same concept at various socio-spatial levels ranging from major world regions to city areas is unmatched in cohesion research. In addition, the *Radar* measure has been picked up to study cohesion in Kyrgyzstan (Larsen et al. 2021), Mexico (Boehnke et al. 2019), and Sri Lanka (Blumör and Licht 2019), and has been used for delving deeper into the relationship between intergenerational mobility and social cohesion (Lambert 2021).

In sum, the *Social Cohesion Radar* constitutes a benchmark in cross-national cohesion research. The utilization of this measure in future studies would aid the process of accumulation of knowledge, a key principle of scientific progress. As one weakness of the *Social Cohesion Radar* is its complexity, a valuable next step is to develop a shorter instrument that matches the known country rankings on the basis of the fully fledged *Social Cohesion Radars* as closely as possible. Such a well-validated *SCR-short*—or many, for different world regions—would facilitate comparative cohesion research in two major ways: index scores could be updated more easily (currently one of the greatest difficulties), and changes in absolute levels of cohesion could be tracked better. Currently, there is no continuous cohesion monitoring, so that long-term trends are analyzed indicator by indicator (e.g., Green et al. 2011). The outbreak of the global COVID-19 pandemic in spring 2020, which necessitated drastic constraints on social life, as well as the economic repercussions of the Russian invasion of Ukraine, have only increased the importance of regular cohesion monitoring. In this regard, the 2022 edition of the *Social Cohesion Radar*

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[4] *Social Cohesion Radar* scores from the period 1996–2003, *VALCOS Index* from 1999. The number of European countries covered in both measures is 26.

for the German federal state of Baden-Württemberg (Boehnke et al. 2022) finds a considerable decrease in the degree of social cohesion compared with the pre-pandemic time—cohesion in 2022 has dropped 10 points down the measurement scale (ranging from 0 to 100) in comparison with its level in 2019.

An open question, however, is whether a complex and rich theoretical construct such as social cohesion could be assessed globally with a "one-size-fits-all" instrument, whether encompassing or short. Caution is warranted to avoid a measure that is unintentionally geared toward Western countries while neglecting the distinctiveness of other cultural zones. Baur's (2014) call to decolonialize social science methodology is well taken. Contextualized indicators have, for example, been used for the *Asian Social Cohesion Radar* (see Delhey and Boehnke 2018); more is needed for expansions into further world regions.

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