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When you Can't Add it Up: Measuring Democracy with QCA*

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Typical democracy measures rely upon categorical classification or continuous indices to indicate the level of democracy in a study's nations. Using Qualitative Comparative Analysis techniques, we demonstrate an alternative method for measuring democracy that retains – in the measure itself – the full-range of included components, which previous measures use in their construction, but conceal in their resultant scores. We directly compare the new measure to existing measures to (a) highlight existing measures' forced comparisons between incommensurate components, and (b) reveal components used to calculate existing measures that do not substantially contribute to nations' democratic classification within them. We then indirectly compare the performance of such a measure to others with an example estimating the relationship between economic development and democracy. The article concludes by discussing some additional advantages of the QCA measure, acknowledging some of its weaknesses, and suggesting several extensions for its use.

Key words: Qualitative Comparative Analysis (QCA); democracy; measurement

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1. WHEN YOU CAN'T ADD IT UP

Democracy is a centrally important concept to scholars doing cross-national research (whether political scientists, sociologists, or other disciplines), policy makers, and even casual observers of current world events. Previous research examines the relationship between democracy and economic development (Sirowy and Inkeles 1991; Przeworski et al. 2000), the accumulation of social capital (Paxton 2002; Muller and Seligson 1994) and war (Jones, Bremer and Singer 1996; Leng and Singer 1988). Democracy is included in research as the dependent variable (Burkhardt and Lewis-Beck 1994; Putnam 1993), among the independent variables (Muller and Seligson 1994; Hewitt 1977), and is modeled as an interdependent relationship (Paxton 2002). To date, however there is no universally accepted means of evaluating whether a nation is democratic, or to measure the various “levels” of democracy observed.

Presently, researchers are forced to choose whether to demarcate democratic classification according to an ideal-typical dichotomy (e.g., Alvarez et al. 1999; Derbyshire and Derbyshire 1996; Muller 1988; Gastil 1978) or tabulated index (e.g., Marshall and Jaggers 2001b; Bollen 1998). In this paper, we develop an alternate descriptive typology of democracy, based on Qualitative Comparative Analysis (QCA) (Ragin 2000; 1987). We demonstrate how this alternative measure retains more of the fullness of existing data than either of the just mentioned approaches.

We provide several comparisons between a QCA democracy measure and previous dichotomous or indexed measures. We make direct contrasts to highlight several of the weaknesses in the current approach. We then explore the relationship between democracy and economic development using this QCA measure and several previous measures. These comparisons show the advantages of the QCA measure, and underscore several important applications for future research. The QCA measure allows researchers to include democracy in a wide range of studies; but to do so in a way that neither requires as-yet unachieved definitional consensus, nor the forced inclusion/exclusion of potentially salient democratic characteristics.

2. BACKGROUND

The word democracy comes from the Greek, *demos* (people) and *kratos* (power), indicating a government of, by and for the people (Arat 1991). Presently, although all studies, measures, and applications of democracy derive from this single root, existing conceptualizations of democracy vary widely (Munck and Verkuillen 2002). Dahl's (1971) concept of *polyarchy* is one of the most commonly accepted operationalizations of democracy applied (or adapted) in current democracy measures and research (e.g., Coppedge and Reinecke 1991; Bollen 1990). There are, however, others who argue for a different conceptualization of democracy

(e.g., Lijphart 1999; and Lindblom 2002). In what follows, we discuss Dahl's components of "democraticness" to lay groundwork for the ensuing discussion. While the argument in this paper draws largely on examples derived from Dahl's definition of democracy, other component sets could easily be used.¹

Table 1 Dahl's (1971) Minimum Requirements for Democracy

Participation ^a	Contestation
1 - Freedom to form and join organizations	5 - Right of political leaders to compete for support (and votes)
2 - Freedom of expression	6 - Alternative sources of information
3 - Right to vote	7 - Free and fair elections
4 - Eligibility for public office	8 - Institutions for making government policies depend on votes and other expressions of preference

^a – While the initial presentation of the eight criteria (Dahl 1971:3) does not break them into these categories, the importance of participation and competition (or contestation) becomes clear in latter parts of Dahl's book.

2.1 Existing Measures

The construction of any democracy measure requires first settling on a set of criteria. Dahl, for example, defines eight minimum criteria for political democracy (1971: 13), which we reproduce in Table 1. Other examples abound. For instance, Bollen (2001) constructs his LIBDEM index from five factors based on Dahl's requirements: political rights (POLRT), right to vote (SUFF), legislative effectiveness (LEGEF), legislative selection (LEGSEL), and party legitimacy.² This index ranges from 0-100, where zero represents the complete absence of any democratic tendencies and a score of 100 corresponds with 'perfect' democracy. Arat (1991) calculates his score similarly by including measures of participation, inclusiveness, competitiveness and coerciveness for each nation to calculate scores, which range from 29-109.³ In addition, Coppedge and Reinecke (1991) draw from Dahl's original components of democracy to develop 10 scale types. Coppedge and Reinecke themselves note some of the difficulties experienced in trying to collapse multiple items into a single index. For example, in 1985, "thirty three countries do not fit the scale types perfectly" (1991:52) and are classified as "approximately equivalent" types to one of the closest fitting perfect scale types.

Several other commonly cited sources, such as the Freedom in the World Rankings (Gastil 1978) or the World Human Rights Guide (Humana 1986), incorporate many different facets of democracy, and then collapse those facets

into easily reportable indices. Gastil for example calculates two categorical scales, measuring political rights (ranging from 0-32) and civil liberties (0-52), which are each then collapsed to seven point scales. He then further reduces countries to three distinct democratic categories: free, partly free, and not free. Prezworski and colleagues (2000) similarly reduce their classification of regime types into Autocracy, Bureaucracy, Parliamentarism, and Presidentialism, while also allowing for mixed types. There are also more blunt measures that yield dichotomous classifications of democracy and non-democracy (e.g., Alvarez et al 1999; Muller 1988; Hewitt 1977). While there are many other commonly used measures, the foregoing provides a general overview of current measures and how they are constructed.⁴

2.2 Critiques of the Current Approach

Regardless of the set of characteristics chosen, or how they are combined into indices, these measures of democracy require comparisons among characteristics that are uniquely important, and not directly comparable or interchangeable (Dahl 1971). In brief, collapsing a range of items into a single indicator masks variation among the unique components of a scale. Here, we summarize four potential problems that this masking produces.

First, the compiled measures may produce scores that are similar (or even identical) for countries with differing compositions of democratic characteristics. All of the present methods for computing democracy scores necessarily must determine which single characteristic, or set of characteristics, qualifies a country as democratic,⁵ or establish a means to quantify the comparative “value” of each democratic component.

Several examples are instructive. In Bollen’s index (2001), a decrease by half of the percentage of the population eligible to vote diminishes a country’s democracy score by twice as much as does a reduction by half of the level of political rights.⁶ These forced comparisons can result in similar, or even identical, scores for countries that have markedly different traits that compose their democracy scores. As a case in point, Brazil, Honduras, South Korea, Peru, The Phillippines, Sudan, Uruguay, and Turkey all have scores of 70.833 in Bollen’s 1988 index of liberal democracy (2001). Table 2, however, shows the variations in the measures compiled to create these countries’ equal composite scores. The QCA measure we propose does not require the collapsing of measures or comparisons that mask such country differences.

Table 2 Liberal Democracy Composition of Select Countries (1988)

Country	Examined Characteristic				
	Political Rights (POLRT)	Product (LEG) of Legislative Selection (LEGSEL) & Legislative Effectiveness (LEGEF)	Party Legitimacy (PARTY)	Percent of Adult Suffrage (SUFF)	Liberal Democracy Score 1988 (LIBDEM)
Brazil	8.333	6.667	6.667	98.10	70.833
Honduras	8.333	6.667	6.667	98.10	70.833
S. Korea	8.333	6.667	6.667	98.80	70.833
Peru	8.333	6.667	6.667	97.60	70.833
Philippines	8.333	6.667	6.667	99.00	70.833
Sudan	5.000	3.333	10.000	99.00	70.833
Turkey	8.333	6.667	6.667	96.40	70.833
Uruguay	10.000	6.667	6.667	97.70	70.833

Second, because studies use a (frequently non-overlapping) variety of characteristics in their democracy measures, meaningful comparison of findings relying on different measures is difficult, if not impossible. Many subsequent applications of the measures rely upon the summary scores adopted from more in depth explorations (e.g., Burkhart and Lewis-Beck 1994 use Gastil 1978 for their outcome measure; Muller and Seligson 1998 rely on Freedom House 2002 among their independent variables). Therefore, the differences that do exist in used summary scores may be obscured in the reported analyses. Moreover if other researchers merely use these summary scores without also examining their composite contributions, they may be unaware of individual indicator variations across included cases. Further still, readers of research only employing the summary scores would have virtually no means for identifying any underlying differences that exist. The QCA measure we propose does not mask cross-country component differences. Instead, it clearly indicates the presence or absence of each component suggested by the adopted democracy definition.

Third, while most measures use multiple components to calculate their final scores of democracy, in practice, qualification as democratic (or more specifically, *non-democratic*) in those indices is frequently based on a limited set of characteristics (fewer than the full set used to calculate the index). One of the primary motivations for using a composite index is that multiple factors contribute to the level of democracy. If a composite index is found, in effect, to hinge qualification as a democracy on a limited number of selected characteristics,

part of the justification for using a composite index in the first place is eliminated. Below we use QCA techniques to directly examine the sets used in some existing democracy measures.

The final potential limitation stems from the *use* of existing measures, not of the measures themselves. The sets of characteristics, and their combinations observed are well studied, understood and applied by the researchers who constructed the measures (e.g., Bollen 2001; Marshall and Jaggers 2001a; 2001b). Unfortunately, when subsequent researchers merely include these summary scores in their analyses of the relationship between democracy and other factors, their understanding of these relationships may be limited because of their unfamiliarity with the democratic features of each country or case.

Incidentally, if those researchers using democracy measures considered more than just the resulting summary scores produced by these studies, the other three weaknesses mentioned above would be less problematic. Many researchers including democratic scores in their analyses, however do little more than plug in the democracy summary scores. Therefore, a typology that includes more of the collected information would improve knowledge of nations' democratic composition for the end-use researchers employing such a measure. The relative advantage of the QCA democracy measure we construct, over existing measures, is most clearly seen in such applications. We therefore compare the results of a simple analysis using traditional measures and our QCA measure to examine the relationship between democratization and economic development. To be able to clearly make those comparisons, we must first describe the proposed approach.

3. CONSTRUCTING AND INTERPRETING A QCA MEASURE OF DEMOCRACY

Qualitative Comparative Analysis (QCA) (Ragin 2000; 1987) simultaneously incorporates the benefits of a traditional qualitative approach – of examining cases as wholes – with the systematic capabilities generally found in quantitative methodologies.⁷ Variables are each classified into limited categories, typically presence (one) or absence (zero), which are compiled into a Truth Table.⁸ This Truth Table includes the combinations of *all* included variables for *every* case. In these tables, a single letter represents each variable, with upper and lower cases respectively representing presence and absence.

For example, if we use “S/s” to denote universal suffrage, “S” would indicate its presence and “s” its absence. Rows of a “Truth Table” generate terms, which then represent the entire case, for which multiplication denotes logical AND. For example, supposing the adoption of Dahl’s characteristics as the criteria included in a democracy measure, the term “SfX” would therefore indicate a country in which we find the simultaneous *presence* of universal suffrage (S),

AND the *absence* of free and fair elections (f), AND the *presence* of freedom of expression (X).

The QCA approach can then compare the complete set of terms for all cases in a sample to identify each unique combination of included indicators that is associated with outcomes of interest. It does so by computing “reduced” equations that summarize the *complete* set of combinations that generate an examined outcome *for the observed set of cases*.⁹ In these “reduced” equations, multiplication continues to denote logical AND while addition indicates logical OR. Any omitted variable, for individual cases (terms) or reduced equations, indicates *any* status (presence *or* absence) of that variable. Suppose that the requirements chosen were: (1) the right for citizens to vote, both through (a) universal male (M/m) and (b) female suffrage (G/g), (2) the eligibility to hold public office (E/e), (3) the existence of free and fair elections (F/f), (4) freedom of expression (X/x), (5) the opportunity to form and join organizations (J/j), (6) the existence of a government that is responsive to popular opinion (R/r), and (7) the right of potential elected officials to compete for votes (V/v). Using those variables, the equation:

(1) (A) MfX + (B) Grx + (C) MGEFXJRV → ECONOMIC DEVELOPMENT

would indicate three separate combinations that are observed as sufficient to produce economic development for a set of observed cases. **Term A** shows that the *presence* of universal male suffrage (M) AND the *absence* of free and fair elections (f) AND the *presence* of freedom of expression (X), AND any combination of the variables not included in the first term (G or g, E or e, X or x, R or r, and V or v) is sufficient to generate economic development for one set of cases in the study. Alternatively, for another set of countries in the study, **Term B** would indicate that economic development arises via the combination of the *presence* of female suffrage (G) AND the *absence* of a responsive government (r) AND the *absence* of free speech (x), AND any combination of the variables not included in the second term. Finally **Term C** indicates that other countries in the study achieve economic development through the simultaneous *presence* of all eight conditions. Each term in Equation 1 therefore represents a sufficient combination to produce economic development in the study sample. Furthermore, while any one of them is individually identified as sufficient, *at least* one of them is necessary to observe the outcome for the cases in the study. In other words, for the observed cases *no other combination* of these democratic indicators would generate economic development.

With this method of compiling democracy scores, each criterion is included, comparisons of potentially incommensurable components are unnecessary, and what is included in the measure is clearly represented in the measure itself – both

for the construction of the measure and for its use in subsequent evaluation of outcomes.

4. COMPARING THE QCA MEASURE TO EXISTING DEMOCRACY SCORES

4.1 Direct Comparison

Some existing measures build on the same sets of criteria to determine democratic qualification, while others use distinctly dissimilar sets. Researchers' different theoretical and empirical motivations may guide their measurement constructions. What is included and how they are combined is unobservable in the final measurement schemes – whether dichotomous, classificatory or continuously composed. A QCA measure explicitly details each of the characteristics included in the final typology, comparisons to other measures or the components included therein are readily available. Additionally, whereas composite measures may produce similar scores for countries that do not have similar levels of democracy, or have differing constructions of democracy (as in the Bollen example in Table 2 above), our QCA measure does not obscure any of the component differences that exist between countries. The scores produced clearly indicate the presence or absence of *each* of the indicators suggested by the adopted definition of democracy.

Beyond these definitional advantages of a QCA measure, one can also evaluate the motivations offered for previous studies' constructions of dichotomous or continuous democracy measures. We use one possible construction of the QCA measure to explore the necessary and sufficient conditions for qualification as democracy and non-democracy, for three commonly used measures (Bollen 2001; Marshall and Jaggers 2000b; and Freedom House 2002), in 80 nations for 1988.¹⁰ In this example, we use the full set of requirements as specified by Dahl to provide the widest spectrum of comparison.¹¹ It could be argued that the proper comparison would only include those measures used to compile the index; we therefore note where that approach would alter the findings below.

4.1.1 Minimized Equations

Using fs/QCA software (Drass, 2000), we compute reduced equations for three existing democracy measures on the various indicators used to construct those measures. In this computation, the outcome of interest is a country's classification as democratic (or non-democratic) on the various measures. Democratic qualification for each measure is defined as follows: a score of greater than 95.00 on Bollen's liberal democracy scale (anything below 95.00 is classified as non-democratic);¹² a score of 10 on the polity scale (anything below 10 is classified as non-democratic); and classification as "free" in the Freedom in the World rankings (partially free and not free are classified as non-democratic). Table 3 presents the reduced equations

for democratic qualification (Panel 1) and for non-democratic qualification (Panel 2) for each of these measures. The reduced equations in this instance apply the measures from Dahl as listed in Table 1, using necessary and sufficient cause analysis (Ragin, 1987) at a confidence level of $p < 0.05$.¹³

Table 3 Reduced QCA Equations for Existing Measures

Measure	Equation	"Outcome"
<i>= Democratic</i>		
Libdem	MEFXRV	> 95.00
Polity IV	MEFXJRV	= 10
Freedom in the World	MEXV + MERV	= Free
<i>= Non-Democratic^a</i>		
Libdem	fxj + fr	< 95.00
Polity IV	fxj + jr	< 10
Freedom in the World	fjr	= Partially / Not free

a – In the reduced equations for non-democracy, the terms for absence of universal suffrage or freedom of expression are actually subsumed under one of the other terms as well. In all cases where *either* of these variables is absent, the observed nations are classified as non-democratic, but only exist coupled with one of the terms listed in the Non-Democratic combinations presented in the table.

4.1.2 Qualifying Democracies

The motivation for using the full list of components in a composite index suggests that all included components are required for democratic qualification. Stated as a QCA equation (using the variables defined in Table 1), this would require that:

$$(2) M G E F X J R V = \text{democracy}.^{14}$$

As such, the reduced equations for qualification as democracy for these three measures (Panel A, Table 3) are not particularly surprising. For Bollen’s (2001) liberal democracy scale, the reduced equation indicates that the presence or absence of the freedom to form and join organizations (absence of “J/j” from the term) combined with the simultaneous presence of all other variables leads to a score of greater than 95.00. Since this measure does not explicitly include the “organizations” component of Dahl’s definition, democratic qualification is contingent upon actual presence of all terms explicitly included. For the polity score from Polity IV, all seven of Dahl’s requirements are necessary for a score of 10.

The Freedom in the World Rankings (Freedom House 2002) classify as “free” any nation that simultaneously offers: universal suffrage AND open eligibility for public office AND unqualified respect for the freedom of information AND a competitive electoral process; OR universal suffrage AND open eligibility for public office AND a responsive government AND a competitive electoral process. The Freedom in the World rankings do not appear by this account to require free and fair elections, freedom of expression, or freedom to form and join organizations for qualification as a “free” nation. Use of Gastil’s rankings in subsequent research frequently relies upon his most summarized form of classification (free, partially free, not free) (e.g., Dixon and Senese 2002), rather than his 7-point scales. These data-summary techniques, whether to 7 point scales or the trichotomous classification scheme, rely on less than the full set of indicators for democratic qualification.

4.1.3 Qualifying Non-Democracies

If each of these components were necessary for democratic qualification, then the reverse would be the best motivation for constructing composite indices. In other words, a more thorough investigation of the existing measures would require testing the negative of Equation 2, which indicates that the absence of any single included indicator should be sufficient for qualification as non-democracy. Stated as a QCA equation:

$$(3) m + g + e + f + x + j + r + v = \text{non-democracy.}$$

The results of the reduced equations in Table 3 however show that this is not the case for the observed nations in the examined measures.¹⁵ For the liberal democracy index, the simultaneous absence of free and fair elections AND absence of freedom of expression AND absence of the freedom to form and join organizations (fxj); OR the simultaneous absence of free and fair elections AND governmental responsiveness (fr) are sufficient for qualification as non-democratic. The first term for non-democratic qualification in the Polity IV index is identical to that in the liberal democracy scale while the second scenario sufficient for non-democratic qualification is the simultaneous absence of the ability to form and join organizations AND the absence of a responsive government (jr). For the Freedom in the World rankings, non-democratic qualification depends on the simultaneous absence of free and fair elections AND absence of the ability to form and join organizations AND absence of a responsive government (fjr).

The Liberal Democracy and Polity IV measures do not hinge qualification as non-democracy on competitiveness of the electoral process (E/e or V/v). This

is particularly surprising for the liberal democracy scores (Bollen 2001) due to Bollen's stated emphasis on Dahl's requirements (1990:16-17). The absence of universal suffrage (s) is also not sufficient for qualification as non-democracy on the liberal democracy or Polity IV measures. The Freedom in the World Rankings include among the non-democratic countries those that have the presence OR absence each of universal suffrage, open eligibility for public office, freedom of expression, and competitiveness of the electoral process. Further, several of the key "requirements" included in these measures are more common in the non-democratic countries than in the democratic ones (e.g., among non-democratic nations - $N_E = 44$, $N_e = 10$; and $N_M = 54$, $N_m = 4$). While any of these requirements may seem conceptually sufficient for classifying a country as non-democratic, we show here that each of the observed measures relies on less than the full set of included indicators for non-democratic classification, thus potentially diminishing the motivation for using the composite scores.¹⁶

4.2 Indirect Comparisons

4.2.1 Democracy and Economic Development

Most cross-national research on democratic development suggests that high levels of economic growth are strongly linked to the rise of political democracy (Inglehart 1990; Diamond 1992; Kitschelt 1992; Muller 1997). Researchers also suggest that democratic development has implications for economic growth. Bunce (2000) suggests that economic development finds its most important political contribution in its capacity to help sustain democracy. While democratic ideas and institutions may rise in both rich and poor nations, the greatest prospects for democratic persistence over time occur when economic development is high (Evans and Whitefield 1995; Yi Feng 1997; Clague et al. 2001). Democratic states, thus, have a vested interest in economic prosperity. These findings are of particular importance for democracies in transition as well as those of tenuous stability. We use the foregoing discussion as a theoretical foundation to examine the association between democratic development and economic growth.

The following example shows the improvements researchers would gain from using a QCA measure instead of a composite index in exploring relationships between economic development and democracy. We gather the Polity IV scores (Marshall and Jaggers 2001b), the measures used to construct those scores (Marshall and Jaggers 2001a; 2001b) and GDP levels per capita (United Nations 2005)¹⁷ for 38 countries for three time periods,¹⁸ to calculate the correlation between GDP changes each from $t_0 - t_1$ and $t_1 - t_2$ and the Polity IV scores (at t_0 and t_1 respectively). We then compare these results to an analysis using the same GDP information and a tabulated QCA summary score of democracy for each of the

nations using only the 5 components that are included in the Polity IV democracy scores. In other words the comparisons presented in this example are based on the exact same information but rely on two different methods of summarizing that information.

Researchers interested in testing the hypothesis that democratic development contributes to economic growth, at the bivariate level, would calculate the correlation between the democracy score at t_0 and the change in GDP from t_0 - t_1 . Similarly, with the data described above, we could calculate the correlation between democracy score at t_1 and the change in GDP from t_1 - t_2 . In these data, the calculated correlations would provide support to the contention that democracy is associated with economic development ($r(D_{t_0}, \Delta GDP_{t_0-t_1}) = 0.874, p < 0.001$, $r(D_{t_1}, \Delta GDP_{t_1-t_2}) = 0.733, p < 0.001$). However, of the 38 countries observed, there are 16 nations with Polity IV _{t_0} scores below zero who experienced GDP growth from t_0 - t_1 (mean growth = 62.34%, range 2-171% growth). Additionally, there are two countries with Polity IV _{t_1} scores of 10 with GDP *declines* of 1.5 and 7.5% respectively. Each of these countries reduce the correlation observed using traditional approaches, but do not necessarily contradict the hypothesized relationship. Their perceived contradiction is merely an artifact of the correlation-based approach.

In this simple example, we observe several of the advantages of the comparative measure. The first advantage is readily apparent when we simply substitute QCA analysis for the correlational approach. We tabulate QCA measures of democracy, using the same five indicators which are used to compute the Polity scores: X/x denotes the presence/absence respectively of regulation of participation (PARREG), J/j the competitiveness of participation (PARCOMP), V/v the competitiveness of executive recruitment (XRCOMP), E/e the openness of executive recruitment (XROPEN) and R/r the executive constraints (XCONST).¹⁹ We code the highest score on each of these indicators as 1 and anything below that as 0. For this analysis, any GDP gain (from t_x - t_{x+1}) greater than zero dollars is coded as 1 and scores that remain the same or decline are coded as zero for economic increase. When using fs/QCA software to compute necessary and sufficient causes (Ragin, 1987) at a confidence level of $p < 0.10$, we get the following equation for both time periods:²⁰

$$(4) \text{XJVE} \rightarrow \text{GDP increase.}$$

This equation indicates that the presence of the four terms included (XJVE) and either the presence or absence of executive constraints (R/r) facilitates GDP increases.²¹ The XJVER term is consistent with theories suggesting that democracy contributes to economic growth. However, the XJVER term would be a contradictory result to this prediction, decreasing the correlation between the

two in any correlation (or multi-variate regression) analysis that includes only such a composite score. In any such analyses, these contradictory terms would be problematic, or in some analyses excluded as outliers. Instead, we show that by including them we can find increased support for the underlying theoretical relationship between democracy and economic development. While this example only shows the inclusion of democracy indicators in the proposed relationship, multivariate analyses using these indexes would experience the same difficulties with contradictory terms and outliers.

This example also demonstrates the potential benefits of incorporating the underlying motivations of case-oriented qualitative research. What case analyses allow is the exploration of unique constellations of factors, as they actually exist, rather than forcing researchers to falsely categorize countries beyond what the data permits. If we measure only the five indicators that are included in the Polity IV measure, to permit inclusion of each of the potential combinations of those five variables in a traditional analysis, we would have to compute and include 24 interaction terms. QCA analysis allows us to, in effect, simultaneously include each of those interactions as well as the five direct indicators. This benefit is perhaps best represented in the countries with the lowest polity scores in these data. There are 42 country-year combinations with observed QCA democracy configurations of $x_j v E_r$, of which 20 show GDP increases. Researchers interested in the relationship between these two characteristics can build on the observation that from t_0 - t_1 GDP increases occur in 4/19 cases and from t_1 - t_2 in 16/23 cases. If they wanted to investigate this discrepancy further, the addition of only two more variables would increase the potential interaction terms to include to well over 100, which would be virtually impossible mathematically, and similarly difficult to interpret if calculable.

Additionally, using our QCA measure removes the implicit assumption included in the correlation-based approach that requires that any increase in democratic indicators results in economic increase, which is an assumption not shared by the theoretical literature. This is an assumption that is merely an artifact of the modeling strategies employed, not in the proposed theoretical relationship.

4.2.2 Measurement Adaptability

The final advantage gained by using our QCA democracy measure is the ready flexibility available to researchers. Structural Equation Modeling techniques have shown that all that is necessary for researchers to replicate regression and SEM analyses is for researchers to include the correlation matrix between included measures. A QCA measure of democracy would introduce similar research transparency. As mentioned above, researchers who construct the many used

measures of democracy often collect substantially more information than is used by analysts who include those measures in later research. Using a QCA typology would allow researchers and analysts alike to more fully represent the information residing in collected data than can the present practice of simply entering scores into a regression equation.

This could be accomplished by including the Truth Table (see Appendix 1 for an example), and/or the methods of constructing a Truth Table (see Appendix 2 for a potential means to tabulate QCA scores using Dahl's eight components). As mentioned previously, researchers have still not reached a consensus of what indicators should be included in a democracy measure. Using a comparative measure would allow researchers to add or remove components, as they deem theoretically relevant to the analysis in their particular research, by simply adding (or subtracting) a row to the Truth Table. This allows for a disentangling of aggregate measures of democracy and better sets the stage for theory building based on more nuanced components of particular political systems at particular points in time.

Additionally, in some cases, the commonalities that exist across nations are hidden by variations in the composite indices or categorical measures. For example, by 1988 *all* of the countries included in Appendix 1 extended the eligibility to vote to women. This shared characteristic across all of the countries included would not be observable to researchers who rely only upon summary scores.

Returning to the example nations in Table 2 that each had identical liberal democracy scores (70.8333) in 1988, the QCA democracy terms for each in 1988 are (from Appendix 1): Brazil – MGEfXJrV, South Korea – MGEfxjrV, Peru – MGEfxjrV, Philippines – MGEfxjRV, and Turkey – MGEfxjrv.²² Other than the constant *presence* of universal male and female suffrage and the openness of eligibility for public office and an absence of free and fair elections, these nations vary in their *compositions of democracy*. While this does not necessarily allow for examination of the “levels” of democracy in each of the nations to be directly examined, some potential problems are clear. For example Turkey possesses only three of Dahl's requirements, while Brazil possesses all but two. Further, the six requirements that Brazil possesses incorporate all three that are present in Turkey. It is therefore difficult to imagine that the citizens of Brazil and Turkey genuinely experience democracy in an identical manner, although the identical scores on Bollen's composite index would suggest they do. The QCA measure, in these cases, affords more thorough representation of the democratic composition (and one could readily assume the experience of democracy as well) in these nations than is possible through a summary score or summary classification.

The final benefit of the adaptability of this measurement approach removes one of the weaknesses of the proposed approach. In QCA analysis, each component

measure must be coded as the simple absence or presence of the particular characteristic. In *Fuzzy Set Social Science*, Ragin (2000) introduces methods that allow for the comparative approach that we describe here, but eliminate the necessity to reduce measures to 0/1 presence/absence categories. With such an extension, the “full disclosure” of measurement that is suggested in this paper would be extended even further, eliminating the necessity of *most* information reduction. In this paper we sought to demonstrate the potential advantages of taking a comparative approach to measuring democracy; which could be readily extended to include fuzzy-set logic.

5. DISCUSSION

Using a QCA measure of democracy allows us to overcome many of the difficulties experienced through the various reduction techniques necessary to produce dichotomous categorizations or continuous indices of democracy. Existing data sets such as Liberal Democracy (Bollen 2001) and Polity IV (Marshall and Jaggers 2001b) each have compiled data points that incorporate a vast array of contributing democratic components for numerous countries spanning extended periods of time. However, the scale creation techniques they employ often masks this richness within a simplified summary measure. When analysts merely include summary scores in their analyses of the relationship between democracy and other factors, their audience’s understanding of the relationships at issue may be limited because the multifaceted nature of democracy remains opaque. The approach we propose facilitates an understanding of democracy along multiple dimensions, thus reducing this limitation. Also, by showing how this measure is constructed we allow for simple replication or modification so that other researchers can easily reap the benefits of this alternative analytic strategy.

By using a QCA measure of democracy, researchers are not forced to compare potentially incomparable democratic components either directly or through complex weighting procedures. This measure also eliminates the practice in dichotomous measures’ need to debate the characteristic or limited set of characteristics necessary for democratic qualification. Instead, researchers can include the full scope of all collected information in any desired analysis. Subsequent use of this measure could provide further support for existing theories by accounting for outliers and contradictory cases, as well as extending these theories to cover cases that must be excluded from more traditional analytic strategies.

NOTES

- 1 Here we seek to highlight the importance of *how* individual components are included and combined in a measure – not to debate *what* individual components should be included in a measure. We will highlight the importance of the adaptability of our method of measurement – including the ability to substitute any other component set – in a later section of the paper.
- 2 Where $LIBDEM = (X1 + X2) / 2$ where $X1 = SUFF$ if $SUFF < (POLRT + LEG) / 0.2$, otherwise $X1 = (POLRT + LEG) / 0.2$, $X2 = PARTY * 10$ (Bollen, 2001, p.26). Where $LEG = (LEGSEL * LEGEF) / 10$ (Bollen 2001:84).
- 3 Arat calculates his score as: Democrativeness = [(Participation x (1 + Inclusiveness) + Competitiveness) – Coerciveness (1991:26).
- 4 As mentioned, the number of existing measures is vast, and we limit our discussion to only a few of the existing measures. For a more thorough review, see Inkeles (1991) or Munck and Verkuilen (2002).
- 5 This necessary and sufficient classification is the explicit motivation for most dichotomous, or ideal-typical democracy classifications. Existing researchers' differing opinions of which characteristics to include is the very reason for the numerous existing ideal-typical classificatory schemes.
- 6 These transformations are calculated by holding all values in Bollen's index constant at their highest values other than suffrage and political rights which we change respectively from 100 to 50 and 10 to five, resulting in liberal democracy scores of 75 and 87.5 respectively. (See footnote 2 for the precise formulas used in these calculations.)
- 7 For a more thorough discussion of the methods and general applications of QCA, see Ragin (2000; 1987), and for a few specific applications of QCA, see for example Berg-Schlosser (1998) and Berg-Schlosser and De Meur (1994).
- 8 Ragin (2000) also proposes methods for incorporating multiple cutoff points, which allows classification beyond zero and one, but for this paper we limit the discussion to the most basic application of the QCA method. Once we show the advantages of the comparative approach, perhaps later extensions of our measurement strategy can extend this to also include the "fuzzy set" logic in Ragin's later work.
- 9 In QCA, "necessary and sufficient" conditions are not identified individually (as would be the approach in regression-based variable approaches), but in combinations – looking for the simplest representation of *all* combinations of necessary and sufficient conditions. All subsequent uses of the word "reduced" in this paper rely on this formal notion of necessary and sufficient identification, and not more common understandings of the term.
- 10 The countries we include in this analysis (listed in Appendix 2) are those with full data on the seven measures listed above, and have libdem, Polity IV and Freedom house scores for 1988.
- 11 We should note that these terms do not include Dahl's requirement of availability of alternative sources of information, since this is addressed by other variables (at least operationally). Further, freedom of expression and the availability of alternative sources of information are somewhat simultaneously incorporated in the measure we use to measure freedom of expression (Humana's [1986], freedom of information).
- 12 This was the seemingly most natural breakpoint in the data used. Further, there were no countries observed with libdem scores *equal* to 95.00. Using other cutoffs does not substantially alter the pattern demonstrated in this table.

- 13 By 1988 all of the included nations extended the right to vote to females. As such, despite its potential relevance (Paxton 2000), we leave female suffrage out of all subsequent analyses for this example.
- 14 A similar equation could be constructed based only on a subset of terms as deemed appropriate, but any such term should again include the *presence* of *all* included variables.
- 15 We should note at this point that it is possible that this finding is due to the fact that all possible combinations are not observed. This could result either from limiting the included nations or simply because the combinations do not exist. Neither of these possibilities however would be observable if we examined only a summarized composite score.
- 16 For some critics, this conceptual entanglement may also set the stage for interrogating the generalizations gleaned from research based on composite democracy scores. This is not something we wish to explore directly here, but instead offer a measure that would allow such questions to be more readily addressed in subsequent research through adopting our measure.
- 17 Measured in constant 2005 US dollars.
- 18 We include here nations from Western and Eastern Europe plus the nations that comprised the former USSR for 1985, 1990 and 1995. While we could explore this case in depth, we refrain for now – to keep the emphasis simply on the methodological improvements available with the new measure. A vast literature examines the particular situation of these countries and this time period. Further, the findings here do not contradict any of those studies, rather may offer some insight into further clarifying the relationships suggested by previous research, particularly by more readily identifying those country cases that weaken the statistical relationships observed in existing research.
- 19 The computation of the POLITY score is DEMOC – AUTOC. Each of these components range from 0 to 10, with the computed total therefore ranging from –10 to 10. For detailed methods of calculation for each of these indices (which include specific additions and subtractions per each score for each of the five terms detailed above), see Marshall and Jaggers (2001a:11-14).
- 20 We should note here that the presence of the E term is observed for all countries in all time periods in these data. Additionally, $x_j\text{VER}$ at t_0 lead to GDP increase from t_0 - t_1 in 66% of the observed cases (not sufficient to qualify at $p < 0.10$).
- 21 The other configuration that we observe frequently is $x_j\text{vEr}$, which leads to GDP increases 4/19 times from t_0 - t_1 and 16/23 times from t_1 - t_2 .
- 22 For the nations without full data available, the partial terms are: Honduras – MGEfrV, Sudan – MGEfrV, Uruguay – MGEfrV. (Note, in this case the absence of the X and J terms for these nations denotes that the indicator was not measured in that year.) Also, it should be noted that these nations achieve scores ranging from 6-8 on the Polity IV scale (Marshall and Jaggers 2001b), and Freedom House (2001) labels each of these nations as free, with the exception of Turkey, which is designated as partially free.

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Appendix 1 QCA Democracy, Libdem, Polity IV Freedom House and Polyarchy Scores, 1988

Country	QCA Democracy Ratings								Libdem Score	Polity	Freedom in the World	Vanhanen
SWEDEN	M	G	E	F	X	J	R	V	99.9	10	F	36.18
DENMARK	M	G	E	F	X	J	R	V	99.875	10	F	45.43
UNITED KINGDOM	M	G	E	F	X	j	R	V	99.75	10	F	32.95
FINLAND	M	G	E	F	X	J	R	V	99.75	10	F	38.69
ITALY	M	G	E	F	X	J	R	V	99.65	10	F	44.22
UNITED STATES	M	G	E	F	X	J	R	V	99.5	10	F	16.73
TRINIDAD	M	G	E	F	X	j	R	V	99.5	9	F	15.07
NEW ZEALAND	M	G	E	F	X	J	R	V	99.5	10	F	28.81
JAPAN	M	G	E	F	X	J	R	V	99.5	10	F	25.15
IRELAND	M	G	E	F	X	J	R	V	99.5	10	F	28.01
COSTA RICA	M	G	E	F	X	J	R	V	99.5	10	F	21.18
CANADA	M	G	E	F	X	J	R	V	99.5	10	F	28.79
BELGIUM	M	G	E	F	X	J	R	V	99.5	10	F	43.54
AUSTRIA	M	G	E	F	X	J	R	V	99.5	10	F	36.47
SWITZERLAND	M	G	E	F	X	J	R	V	99.4	10	F	20.65
PORTUGAL	M	G	E	F	X	J	R	V	99.4	10	F	28.12
NORWAY	M	G	E	F	X	J	R	V	99.4	10	F	37.06
NETHERLANDS	M	G	E	F	X	J	R	V	99.4	10	F	41.01
FRANCE	M	G	E	F	X	j	r	V	99.4	9	F	32.02
AUSTRALIA	M	G	E	F	X	j	R	V	99.25	10	F	30.79
INDIA	M	G	E	f	X	j	R	V	95.8333	8	F	16.24
GREECE	M	G	E	f	X	J	R	V	95.8333	10	F	34.74
JAMAICA	M	G	E	f	X	J	R	V	87.5	10	F	0.12
ECUADOR	M	G	E	f	X	j	R	V	87.5	-5	F	18.41
COLOMBIA	M	G	E	f	x	j	r	V	87.5	8	F	10.16
BOTSWANA	M	G	E	f	X	j	R	V	87.5	9	F	6.91
BOLIVIA	M	G	E	f	x	j	R	V	87.5	9	F	8.76
SPAIN	M	G	E	F	X	J	R	V	83.3333	10	F	28.96
MEXICO	M	G	E	f	x	j	r	V	83.3333	0	PF	11.39
GERMANY WEST	M	G	E	F	X	J	R	V	83.0833	10	F	34.53
VENEZUELA	M	G	E	F	X	J	r	V	82.3333	9	F	18.75
ISRAEL	M	G	E	f	x	j	R	V	79.1667	9	F	35.41
ARGENTINA	M	G	E	f	X	J	R	V	79.1667	8	F	24.05
DOMINICAN REP	M	G	E	F	X	j	r	V	75	6	F	18.34
TURKEY	M	G	E	f	x	j	r	v	70.8333	7	PF	29.05
PHILIPPINES	M	G	E	f	x	j	R	V	70.8333	8	F	17.01
PERU	M	G	E	f	x	j	r	V	70.8333	7	F	15.28

KOREA S-(ROK)	M	G	E	f	x	j	r	V	70.8333	6	F	33.21
BRAZIL	M	G	E	f	X	J	r	V	70.8333	8	F	7.81
THAILAND	M	G	E	f	x	j	r	v	66.6667	3	PF	5.69
SRI LANKA	M	G	E	f	x	j	r	V	66.6667	5	PF	16.28
PAKISTAN	M	G	E	f	x	j	R	V	66.6667	8	PF	11.54
MOROCCO	M	G	e	f	x	j	r	v	62.5	-8	PF	0.94
MALAYSIA	M	G	E	f	x	j	r	v	62.5	4	PF	12.25
SENEGAL	M	G	E	f	X	j	r	v	58.3333	-1	PF	4.40
EGYPT	M	G	E	f	x	j	r	v	50	-5	PF	2.43

Appendix 1 (cont'd). QCA Democracy, Libdem, Polity IV Freedom House and Polyarchy Scores, 1988

Country	QCA Democracy Ratings								Libdem Score	Polity	Freedom in the World	Vanhanen
SINGAPORE	M	G	E	f	x	j	r	V	45.8333	-2	PF	19.71
INDONESIA	M	G	E	f	x	j	r	v	33.3333	-7	PF	16.24
SYRIA	M	G	E	f	x	j	r	v	29.1667	-9	NF	0
PARAGUAY	M	G	E	f	x	j	r	v	29.1667	-8	NF	3.47
PANAMA	M	G	E	f	X	j	r	v	29.1667	-8	NF	14.75
BANGLADESH	M	G	e	f	x	j	r	v	29.1667	-5	PF	4.25
YUGOSLAVIA	M	G	E	f	x	j	r	V	25	-5	PF	0
TUNISIA	M	G	E	f	x	j	r	v	20.8333	-5	PF	0
TANZANIA	M	G	E	f	x	j	r	V	20.8333	-7	NF	0.99
SIERRA LEON	M	G	E	f	x	j	r	v	16.6667	-7	PF	0.02
POLAND	M	G	E	f	x	j	r	V	16.6667	-6	PF	0.28
LIBERIA	M	G	e	f	x	j	r	v	16.6667	-6	PF	0
HUNGARY	M	G	E	f	x	j	r	v	16.6667	-2	PF	0
ALGERIA	M	G	E	f	x	j	r	v	16.6667	-9	NF	3.21
ZAMBIA	M	G	E	f	x	j	r	v	12.5	-9	PF	0.88
VIETNAM	M	G	E	f	x	j	r	v	12.5	-7	NF	0
SOVIET UNION	M	G	E	f	x	j	r	v	12.5	-6	NF	0
KENYA	M	G	E	f	x	j	r	V	12.5	-7	NF	0
ETHIOPIA	M	G	E	f	x	j	r	v	12.5	-8	NF	0
CHINA	M	G	E	f	x	j	r	v	12.5	-7	NF	0
CAMEROON	M	G	E	f	x	j	r	v	12.5	-8	NF	0
ROMANIA	M	G	E	f	x	j	r	V	8.3333	-8	NF	1.59
KOREA N-(DPR)	M	G	E	f	x	j	r	v	8.3333	-9	NF	0
IRAQ	M	G	E	f	x	j	r	v	8.3333	-9	NF	0
GERMANY EAST	M	G	E	f	x	j	r	v	8.3333	-9	NF	0.07
CZECHOSLOVAKIA	M	G	E	f	x	j	r	v	8.3333	-7	NF	0.07
CUBA	M	G	e	f	x	j	r	v	8.3333	-7	NF	0
CHILE	M	G	e	f	x	j	r	v	8.3333	-1	PF	0
BULGARIA	M	G	E	f	x	j	r	v	8.3333	-7	NF	0
BENIN	M	G	e	f	x	j	r	v	8.3333	-7	NF	0
NIGERIA	m	G	e	f	x	j	r	v	0	-7	PF	0
LIBYA	m	G	e	f	x	j	r	v	0	-7	NF	0
HAITI	m	G	e	f	x	j	r	v	0	-7	NF	0
GHANA	m	G	e	f	x	j	r	v	0	-7	NF	0

Appendix 2 A Proposed Set of Measures, Data Sources and Coding Procedures for QCA Measure Construction

Variable	Data Source	Variable	Range / Categories	Coding Procedure
1a – universal suffrage	Bollen, 2001	Adult suffrage – as percentages by year (SUFF__ ^a)	0–100%	Vast majority eligible to vote (SUFF ≥ 90) then M = 1 Else, m = 0
1b – female suffrage	Paxton, 2000	Date of extension of suffrage to women	1893–1984	for date of interest, if prior to suffrage date, g=0, if after date, G=1
2 – eligibility for public office	Marshall & Jagers, 2001b	Openness of executive recruitment (XROPEN)	4 – open 3 – dual executive, designation 2 – dual executive, election 1 – closed	Open (XROPEN = 4) results in coding E = 1 Else, e = 0
3 – free & fair elections	Bollen, 2001	Political Rights – based on Gastil, 1978 (POLRT__)	0 – tyranny 3.3 – closely controlled / insignificant elections 6.7 – elections occur, but with massive interference 10 – vast majority free to participate ^b	Vast majority free to participate (POLRT = 10) then F = 1 Else, f = 0
4 – freedom of expression	Bollen, 2001	Humana, 1986, freedom of information ^c (FRINF__)	0 – constant violations 3.3 – frequent violations 6.7 – occasional violations 10 – unqualified respect	Unqualified respect (FRINF = 10) then X = 1 Else, x = 0
5 – opportunity to form and join organizations	Bollen, 2001	Humana, 1986, freedom of association (ASSC__)	0 – constant violations 3.3 – frequent violations 6.7 – occasional violations 10 – unqualified respect	Unqualified respect (ASSC = 10) then J = 1 Else, j = 0
6 – governmental responsiveness	Marshall & Jagers, 2001b	Executive restraints (XCONST)	1 – unlimited authority 3 – slight to moderate limitations 5 – substantial limitations 7 – executive parity or subordination	Executive parity (XCONST = 7) then R = 1 Else, r = 0
7 – electoral competitiveness	Bollen, 2001	Competitiveness of the nomination process, based on Banks, 1979 (COMPET__)	0 – non-competitive 5 – partially competitive 10 – competitive	Competitive nomination process (COMPET = 10) then V = 1 Else, v = 0

a - All __ denote the substitution of the relevant year.

b - This is a selection of the categories available, for a full listing, see p. 46, Bollen, 2001.

c - This is changed to freedom of information and technology in 1991.