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Politics and Quality of Life

The Role of Well-Being in Political Outcomes

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Chapter 1
Introduction: Quality of Life Studies; Our Dulling and Rusting Tools

The notion of what it means to have a high quality of life, to lead the good life, or simply to be happy has become increasingly the focus of social scientists. Its roots, however, extend much farther, at least to the foundations of the western world in philosophical treatises, the platonic dialogues, and perhaps most significantly in the Aristotelian conception of eudaimonia and questions of the proper social and political order (Russel, 2014). These philosophical foundations are all rooted in the commonality of what seems to be a near universal longing for a life well lived, and as a corollary a society organized in such a way as to achieve that life.

Even with this deep history of the study of life quality and the relative importance early philosophers placed on understanding what a high-quality life was and how to achieve it, most policymakers and economists think narrowly about the world's workings, applying their reductive scientific approaches, often to the point that all nuance and complexity is lost. At the core of their endeavor is the necessary simplification of a complex world to a few key ingredients that fit into the models we build. This is at the core of the scientific method, but in boiling the world down to a few key measures calls for extreme caution in order to prevent casting away concepts, ideas, and even data that are important to understanding the question the researcher wishes to pose, and the concepts they seek to understand. We are sympathetic to this problem and as social scientists often find our own models are likely subject to the same critique.

Some writers believe a single measure, gross domestic product (GDP) or expected lifespan, for example, adequately captures the richness of the world and that they can serve as a proxy for sufficient quality of life. It is as if the metric appears to them as a lever and button to be pulled and pushed for a desired effect, and that in so doing counties will arrive at a high quality of life. Sadly, this trend might be an unfortunate side effect from moving the conversation out of the theoretical realm of philosophy with the lengthy discourses on the metaphysics of human flourishing and into the more scientific and empirical fields of economics and social science where parsimony in seeking to quantify and model the same questions is encouraged and rewarded.

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The founder of modern economics, Adam Smith long ago criticized such "men of system", pointing out that such individuals cannot fathom that those people they seek to guide and nudge are anything more than chess pieces to be moved according to their own plans (Smith, 1790). They find it baffling that the pieces could have their own principles, drive, or desires. Or in the case of quality of life their own understanding of what a high quality of life could be. Many of the commonly accepted approaches to understanding quality of life generally fall into this narrow thinking trap. That such work has gone on with so little challenge and discussion is somewhat baffling. It appears, however, that we may have let our investigative tools as social scientists dull and rust. Our aim here is in sharpening and cleaning those tools within the quality of life field as well as providing a new tool: a county-level index of quality of life.

The quality of life index we develop should not be interpreted as falling into such narrow thinking about what well-being means We believe more can be done to expand our understanding of quality of life and recognize that our metric is just one such tool. To this end we focus on individual demands and desires and hold the individual primarily in mind even as we craft a measure at the county level.

In our first attempts at understanding life quality it became evident that individuals agree widely on the parts of life that matter. Conversations across states, coasts, and even countries, reveal deep commonalities in desires, aspirations, and values. The scholarly literature and what citizens demand from their political leaders demonstrate this expansive agreement. A short reading of any political party platform, the daily newspaper in nearly any locale, and perhaps especially short visits to coffee shops reveals both the complexity of what individuals mean when they think about life quality and the commonalities that exist. The index of quality of life we develop represents our conversations, observation, and study of the individuals whose life quality we want to measure as well as an engagement with the scholarly literature.

We found conversations and our own backgrounds in our small hometowns enlightening. The people we knew value many more aspects of their life than can be boiled down to a single measure. A metric like GDP, income, or education levels may serve as a proxy, but it is a rough and inexact estimate which excludes much of what a high-quality life is from its accounting. Though income has long been relied on, sometimes in combination with other simple measures, it is time to continue to push the conversation about quality of life, its measurement, and application forward. The ultimate measures we develop are more granular and finer than any existing measure we encountered. There have been other county level inquiries into quality of life, but even some published in the most prestigious academic journals do not extend as far as ours. Although their methodology could likely be expanded to the full universe of counties, a prominent paper published in the *American Economic Review* only ranked 253 of US counties where we ultimately score, rank, and compare more than 10 times that amount (Blomquist, Berger, & Hoehn, 1998).

Advocates of using single metrics argue it is enough to monitor GDP because these measures track economic development and that economic development is among the most important parts of life quality. This argument while certainly cap-

turing the relative importance of economic development to life quality, is not likely the primary reason these measures are relied on. Rather, we believe these measures are commonly used because of the ease with which they are collected, monitored, and explained. Yes, broadly the common ingredients for a good life follow trends in GDP and per capita income, but they miss the intricacies and interlocking nature of other determinants. We join others interested in quality of life in advocating for moving beyond these simple measures (Costanza, Hart, Posner, & Talberth, 2009; Costanza et al., 2014).

Individuals don't want any single thing. They are not single-peaked maximizers, as all good economists know, even as many tend to forget the multiplicity of desires in practice and in their recommendations. Despite many policymakers, and the models, they use treating individuals as if they had only one desire, it has long been obvious people have many interests. For example, GDP is a useful measurement with powerful uses, but is it enough of a measure for community trust? Or community safety? Or any of the plethora of attributes that make for a high quality of life?

In this vein, we harken back to Aristotle's ideas of eudaimonia in creating our index. The best translation or understanding of eudaimonia is human flourishing. It is not wealth itself. It is not education or safety alone. Instead, human flourishing incorporates and includes all of these aspects and more. It is eudaimonia that scholars who are interested in human fulfillment and welfare should be striving to rigorously and clearly measure in the hopes that they may ultimately inform policymakers and legislators and provide insight into how to structure the political and social life to foster human flourishing. Many common metrics are broad metrics and amount to only rough proxies that do little to tease out differences, contrasts, and causality in the relationships they uncover. While they are certainly well-suited for their individual tasks, there are many interesting questions for which they will simply not provide acceptable tools.

Our index focuses on five areas as we work to capture eudaimonia in the form of quality of life: public safety, health, economic development, infrastructure, and education. We believe these are the integral and vital parts of quality of life. Each of these indicators is commonly referred to by others interested in studying life quality. Several, such as economic development and health, have common and reliable metrics that are often used in similar studies to our ultimate goal. Many of these, such as income and levels of education, also appear in our index. A fundamental difference, however, is that they are not the only aspects of each area. Our indicators are composed of numerous components and one improvement of our quality of life model over others it that anyone who is interested can examine and pull apart the index because it does not rely on a solitary and simplistic measure such as GDP. By accounting for the numerous factors that are tied to individual happiness, and high life quality its design incorporates the plain fact that many scholars will disagree over what should be included and may want to recalculate the index based on those disagreements for replication, extension, and critique.

Perhaps fundamentally our research revealed that because people have many interests and desires for their life, they are willing to make tradeoffs between common measures and even within our own chosen indicators. Individuals practice

this kind of sorting naturally. They are drawn into careers, communities, and even leisure activities that fit their idea of a good life. Some quality of life research examines migration patterns in and out of areas with greater or lesser quality of life (Cebula & Vedder, 1973; Chen & Rosenthal, 2008; Deller, Tsai, Marcouiller, & English, 2001), but such trends are also important and apparent in both the long run and broader facets of society. People would not be satisfied if their life consisted of high incomes and luxury, but with high personal risks and low security. Thus, nearly every community demands and institutes a police force and fire department. Similarly, no one is satisfied with a life of wealth if they are unable to travel or lack the ability to do what they desire with relative ease. Hence, we arrive at roads and public works. Throughout this book, we examine these tradeoffs and explore the role of life quality as individuals within society attempt to organize in ways that encourage human flourishing and high quality of life.

The Roots and Purpose of this Project

Much of our past research focuses on environmental and energy issues, especially on public lands. In fact, the initial impetus behind this project arose from our desire to better understand the relationship between publicly owned lands and rural communities. Public lands are reportedly associated with many positive impacts on the well-being of citizens – economically and in non-quantifiable ways (Sonoran Institute, 2006, pg. 6, 11). As self-described environmentalists and scholars interested in public lands we found such claims intriguing and decided the ideas warranted a more in-depth examination.

After beginning our research, we quickly became dissatisfied with the existing measures of well-being, especially at the county level where they appeared essentially nonexistent. Though there were, and continue to be many claims of benefits from public lands few of the empirical studies included robust definitions of quality of life. It is difficult to establish evidence in favor of the proposition that public lands improve the lives of those close to them when the definition of life quality is lacking substance. Firmly defending the propositions requires establishing and testing possible causal links and the driving forces in the relationship. Before we could measure the quality of life in any area, a full conception of life quality needed to be developed.

Thus, one of our first tasks was to arrive at and adopt a definition of life quality that consistent with both Aristotle's view of human flourishing and with our own observations of what individuals perceive as being important to have a high quality of life. We adopt as our broad definition of quality of life, that quality of life is the measured fulfillment of human wants and needs. This broad and expansive definition, which we would view as defining the plethora of terms related to quality of life including well-being and life quality, supplied a starting place and an approach to begin to explore those initial questions of life quality in areas surrounded by public

lands. What we found there led us to a more expansive study of how to measure life quality and its effects in the political and social realm.

Our interest in the relationship between public lands and quality of life led one of your coauthors Yonk, to one of the central research questions he has focused on, how to measure life quality, which Smith later joined as a research assistant and coauthor. Despite long-standing debates in various fields like economics, sociology, and political science, the concept of well-being has no clear consensus on its measurement. It is a strange and exciting state for a field to be in. Everyone agrees it is important, but few employ the same definitions and metrics unless they are using the simplified metrics criticized earlier.

For academic fields to progress and improve scholars need to propose precise and exacting definitions. Importantly, fields risk splintering and unproductive siloing if members disagree on basic axioms, methods, and in the case of quality of life studies, definitions. We propose our definition and method here and open it to the revision and adaptation by other scholars who will see uses for, and problems with it that we cannot now imagine.

We do not wish to merely quibble over definitions, but extend and challenge the field in other ways. Much of the value of measuring quality of life comes not from a novel approach to that measurement but from how a measure of quality of life can be used to explain the phenomenon in the real world, particularly political phenomenon. To this end, we first build an index and then apply it to political phenomena.

In building the index we were faced with one of the key questions that would define our thinking about quality of life. We struggled with how to conceptualize life quality in our own thinking and approach. Is quality of life primarily an outcome? Something to be maximized like GPD and placed in the traditional rationalist approaches, where the chief questions are what leads to higher life quality and the fundamental policy questions are maximization questions.

This conceptualization while compelling left us with the nagging sense that it was leaving something out. Life quality was considered by individuals not just as an outcome at the end of a process but many individuals spoke of life quality as though it were a resource to be used and valued not just as the end they were trying to achieve. Quickly, however, even this conception left us feeling as though there was something else missing.

We then began thinking about well-being through a behavioral lens and about the impact differing levels of life quality had on actions and choices within individuals social and political lives. What has become clear to us is that life quality functions in all of these ways at different times and under different circumstances, sometimes the question is how to maximize the outcome, at others it is how to use the resource to greatest advantage. Further we find throughout the life quality of the individual has a substantial impact on how that individual thinks about and engages with social and political questions.

We begin our exploration of life quality and its social and political impacts by exploring other literature on quality of life and well-being and we situate ourselves in the pioneering work of others in defining the concept before going on to develop and validate our own index. We then turn to the development of our conception of

the function of life quality in social and political questions including how it affects political and social outcomes and is affected by those same outcomes. We then explain how our index is constructed and provide the details needed to recreate and adapt our work for use in related fields or by others. The following chapters then apply our theory to empirical studies of trust, ballot measures, tax decisions, and the effects of federal spending. We explore well-being both as a measure and as an important variable in settings of interest to the legislator, economist, political scientist, and policymaker. Our final chapter proposes areas where we believe our index can be extended into new areas and, more importantly, improved. Chapter 10's main thrust, however, is about the potential problems of creating an index and how it may be abused if incorrectly understood.

Our Goals

We began this project to provide policymakers with a more useful guide for encouraging eudaimonia in the lives of their constituents and to push the boundaries of the academic study of well-being. We hope that those who are actively engaged in attempts to improve and assist the development of high quality of life for individuals will be aided in their attempt to do so by our work. Ultimately, we look forward to future discussions of our index with both academia and policy wonks. Bridging the gap between the ivory tower of academia and the practical realities of policy work is a vitally important opportunity for promoting quality of life that is too often squandered by both parties.

Chapter 2
Understanding Quality of Life

Despite the clear importance of life quality to both individuals and public policy, defining and measuring quality of life is a difficult affair. The general concept includes much that is clear and easily measured, such as income or education level, but it's also clear that there are other factors that are more ethereal and therefore difficult to capture. We believe the index we develop captures both those easily measurable factors and many of those that are more difficult to account for.

Like any good work of social science, our work begins from a conceptual definition of quality of life, and then attempts to operationalize that definition. We take as our definition that quality of life is the measured fulfillment of human wants and needs. We arrived at this conception of quality of life after reviewing and exploring the large literature that has explored quality of life both conceptually and empirically. We assert that our definition is of particular value because it condenses the concept to something clear and easily understandable while also allowing us to operationalize that definition effectively. Fundamentally what our index attempts to do is to measure that fulfillment of human wants and needs.

Many definitions of quality of life are ill-defined and are therefore are ill suited for use in empirical work and fail the test of being operational. For example, "enjoying one's life", begins to capture the concept of life quality, but it is not easily operationalized and is therefore not particularly useful for our purposes.

In this chapter and the next, we explore the definitions of quality of life we encountered in our review of the scholarly literature and present a conceptual definition of our own. Extending and developing what we have done in previous work (Yonk, Smith, & Wardle, 2017), we also explain in broad terms how the index is created and why we chose to use those particular methods instead of others. Chapter 4 goes into greater detail on the mechanical construction of the index. Those readers less interested in the mechanics of building the index itself will be best served by reading this chapter and the following and then referring to Chap. 4's details on our index's construction as needed.

The index we develop is unique because it examines counties in the United States, but also because comprehensive indexes of quality of life are relatively

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limited in the scholarly literature. Instead, it is more common to include a simple measure that is reliably related to quality of life as a proxy for quality of life overall. In fact, many of the studies we examined do not explicitly label their work as an index, but they are measuring quality of life in some way and so are relevant to our project. Further many of the indexes that do exists are generally focused on the quality of life at the national or cross-national level.

That many of the studies and extant indexes are aimed at measuring quality of life of states or nations rather than the more local level, does not affect the underlying logic of our index. If one concept is important in measuring the quality of life in a nation, it is likely to also be important at the county-level. There are certainly important differences that should be considered, of course. For example, spending on national defense instead of spending on police and fire protection, but both fundamentally measure a similar underlying concept, security. This example reveals the power of the sort of index we develop. The logic is the same even though the unit of analysis has changed from nation to county. The indicators and the concepts we select and the areas we cover in this and the following chapter are important for well-being regardless of whether you are concerned with nations, cities, individuals, or our counties. Appropriate measures for each unit of analysis may vary, but it is the underlying rationale that is important and consistent.

Scholarly Work on Quality of Life

To make policy prescriptions or meaningful observations about society, scholars of economics, sociology, political science and social psychology have all attempted to define and quantify their definitions of quality of life. The root of the problem with the most common definitions of life quality is their reliance on a single piece of data. Many definitions in the wider literature are one dimensional, but quality of life is not fully captured by any single piece of data, or a single dimension. Instead, quality of life is a multidimensional concept that requires a multiplicity of measures to effectively capture it.

It is clear from the history of quality of life that the concept is of value to policymakers and politicians. For instance, Milbrath (1979) states that quality of life information is a useful policymaking tool because it can: "identify predicaments, provide value weightings, infer prospective project impacts, assess project outcomes…suggest alternate lifestyles, [and] alert leaders to growing disaffection" (p. 32). Politicians have also found it a compelling part of their campaigns and political agendas. Campbell (1981) quotes President Lyndon B. Johnson as saying:

> The task of the Great Society is to ensure the people the environment, the capacities, and the social structures which will give them a meaningful chance to pursue their individual happiness. Thus the Great Society is concerned not with how much, but with how good - not with the quantity of goods, but with the quality of our lives (p. 4).

We agree with these assessments of the potential applications of a consistent quality of life measure. Our index ultimately identifies essential elements of

Table 2.1 Key quality of life studies/indexes reviewed

Study (Year)
Graves (1976)
Rosen (1979)
Roback (1982)
Blomquist et al. (1988)
Cheshire and Hay (1989)
Stover and Leven (1992)
Sufian & Jafar (1993)
Ready, Burger, and Blomquist (1997)
Giannias (1998)
Florida (2002)
Glaeser et al. (2001)
Shapiro (2006)
Schmidt and Courant (2006)
Cheshire and Magrini (2006)

well-being that can be used as a reference point for policymakers and politicians in practical applications. Academics and others interested in studying quality of life will also find it useful in establishing new criteria to evaluate policy changes and other events with.

The prodigious literature that considers quality of life touches many areas of interest. Unfortunately, most of it has failed to connect the overlapping indicators and methods from various fields. There is consensus on the broad heuristics that are commonly employed to capture quality of life, such as GDP or longevity, but little effort to achieve a consensus on what must be included in quality of life measures and how to best measure it. We examined many of the past measures of quality of life that have been employed by other researchers. Each found disparate aspects to include in their studies, usually based on the content and scope of what the research explored. They did, however, have substantial overlap in what they chose to include (Table 2.1).

One of the most useful papers surveying the quality of life literature is Lambiri, Biagi, and Royuela (2006), which compiled many of the significant studies and analyzed their similarities. Lambiri and company's distinctions are useful in investigating what different studies have used to measure the quality of life in their area of interest. According to Lambiri et al. (2006), the indicators can be formed into six different classifications:

> natural environment (climate, state of natural environment, etc.), built environment (type and state of building, etc.), socio-political environment (community life, political participation, etc.), local economic environment (local income, unemployment, etc.), cultural and leisure environment (museums, restaurants, etc.), public policy environment (safety, health care, education provision, etc.) (pg. 9).

Our final classification system is broader than their method, but we include five adapted categories and exclude questions about the natural environment such as

weather or climate. Because our goal is to examine political phenomena and their relationship with quality of life our classifications are each focused on examining metrics directly related to those questions. We believe that the most important factors within quality of life are: public safety, health, infrastructure, education, and economic development. We believe these are consistent and common themes within the study of well-being (the lack of a miscellaneous category notwithstanding). Together they capture the multi-dimensional and rich nature of quality of life.

The studies we reviewed and the wider literature on life quality provided a number of insights into how the indicators we are most interested in are likely to relate to Quality of life. In the rest of this chapter we summarize the existing work on well-being, the foundation of our index, with regards to each of our categories before turning to an in-depth discussion of those indicators in Chap. 3.

Public Safety

Unsurprisingly, in many of the quality of life studies we examined most public safety measures included some element regarding crime. Most indexes or studies contain measures of the frequency of violent crime. Graves (1976), for example, used the number of violent crimes per 100,000. Rosen (1979) simply uses the total crime rate. Blomquist, Berger, and Hoehn (1988), Ceshire and Hay (1989), Stover and Leven (1992), Ready, Burger, and Blomquist (1997), Nzaku and Bukenya (2005) (even though they place this measure in an "amenities" category), and Shapiro (2006) all use a measure of violent crime in the area to measure public safety.

A few studies use indicators that are not as simplistically defined as crime in an area. Perhaps the most sophisticated example, Henderson, Lickerman, and Flynn (2000) create a variable to represent determinants of public safety and outcomes. For determinants they include risk-taking, alcohol use, protection, training, laws, product design, financial incentives, and natural phenomena and cultural values. For outcomes they use vehicles, firearms, poisonings, falls, acute illness, and chronic illness to represent public safety (Henderson et al., 2000). Gyourko and Tracy (1991) use a measure (though again, they place it inside another variable, this time as part of their fiscal measurement) of government services: police services, per capita incidence of violent crime, and fire insurance company local premium. A 2017 report by Gallup documents how safe people feel and their confidence in local police. Astoundingly it finds that in some countries one in four people have been mugged or otherwise assaulted in the last year (Gallup, 2017). *The Economist* (2005) contains estimates of political stability and security to compare public safety between countries.

Health

The measure for health in quality of life indexes varied more than the relatively uniform public safety measurement. Mortality rates and life expectancy were an ordinary method for proxying health. Of the indexes examined, however, 11 did not include a variable that captured the effects of a health index, which seems a troublesome oversight.

Henderson et al. (2000) employ a composite including infant mortality rate, the life expectancy rate, and self-reported health. Life expectancy when born is included by *The Economist* (2005) for their health indicator. While Sufian and Jafar (1993) use only the infant mortality rate, while infant mortality, child mortality, and maternal mortality is utilized in Agostini and Richardson's (1997) measure of health.

Other, more unique forms of quantifying the health of an area are also developed. Graves (1976) measures the number of physicians per 100,000 people. Gyourko and Tracy (1991) use the number of hospital beds per 1000 people. Although they intended to measure the economic environment, Nzaku and Bukenya (2005) count the number of non-federal physicians and capture not only something about the labor market factors, but also the health of the area. Schmidt and Courant (2006) use an innovative composite variable comprised of number of hospital beds, number of hospital services provided, and a per capita measure of general and family practitioners, medical specialists, and surgical specialists.

Infrastructure

The literature has not come to a consensus on the best form of representation that can be attributed to infrastructure. Studies that examined infrastructure generally quantified it using: population characteristics, available utilities, and housing characteristics.

Population size and density is included in Rosen (1979) and Roback (1982) but each respectively includes central city population and population growth rate to differentiate the studies. Nzaku and Bukenya's (2005) utilize a composite comprised of population density with age of the population, non-white population, owner-occupied housing, per capita tax rate, distance to metro area, as well as road density. Some indexes also contain the available facilities for the treatment of water, sewage, or landfills (Blomquist et al., 1988; Henderson et al., 2000; Stover & Leven, 1992; Ready et al., 1997).

Other infrastructure measures in the literature include the average number of persons per room in housing, the percentage of housing with electricity, and the number of telephones per 100 people (Sufian and Jafar, 1993). Some examine housing to determine this variable: number of rooms, number of bathrooms, and age of housing (Giannias et al., 1999). Calvert and Henderson included a variety of other factors in their variable as well: transportation (including highways, railroads, air

and transit, and waterways), communications (telephone, radio, and post), utilities (electric, gas, water, sewer, and disposal), and health safety and education (schools, hospitals, fire and police, and conservation and parks (Henderson et al., 2000).

Education

About half of the indexes we reviewed contained various measures of the quality of education. Usually this was represented as the student-teacher ratio based on the theory that student to teacher ratios are important markers of educational quality (Blomquist et al., 1988; Gyourko & Tracy, 1991; Ready et al., 1997; Stover & Leven, 1992).

One of the most obvious measures of education in an area is the educational attainment of its residents. To this end, Calvert and Henderson built a composite variable including: educational attainment levels, educational expenditures, literacy rates, access to education, distribution, segregation, discrimination, lifelong learning, and alternative education (Henderson et al., 2000).

A divide that has developed in the literature that includes education in quality of life indices, is between input-based and output-based measures, although the distinction is not always immediately apparent. The literature that includes inputs measures like cost-adjusted per pupil, and library circulation in number of books were less common, but Schmidt and Courant (2006) work includes them. Measures described as outputs were more common. For example, the percent of children in secondary school (Sufian and Jafar, 1993), or mean year of schooling, the number of 16-year-olds enrolled in school, and college and post-college graduates (Agostini & Richardson, 1997). Regardless of whether they are classified by their author as inputs or outputs the potential relationship between them and education as a potential indicator of quality of life is apparent.

Economic Environment

Quantifying the state of the economic environment within the area being studied is ubiquitous in its inclusion in the indexes we reviewed. There are many common indicators used to capture the economy's health. Per capita income and GDP are perhaps the most common methods for gaining a rough idea of the economic health of an area and many studies outside of the field of well-being use it. GDP per person and percent unemployment is used by *The Economist* (2005) in their quality of life index. The unemployment rate is found in Roback (1982) and Rosen (1979), but population growth is included only in Rosen's work. Agostini and Richardson (1997) approximate economic standing with the real per capita income.

Other indicators use less conventional methods of capturing the nature of the economic environment. Sufian and Jafar (1993) measures the percent of income that is spent on food. Nazuka and Bukenya (2005) use a composite measure including metropolitan influence, net migration, jobs in agriculture, jobs in manu-

facturing, and jobs in the service sector of the area's economy. Schmidt and Courant (2006) measure the percent living below the poverty line. Calvert and Henderson comprise their indicators from two composite variables. First, the income model is made of: demographics, stocks, housing, pensions, hours of paid work, hourly wages, hourly benefits, capital income, government transfers, and other income. Second, the employment model includes the number of people in the labor force and the number of people not in the labor force (Henderson et al., 2000).

Other Indicators

Although many of the indexes examined had variables that fit well within these categories, there were instances of those indexes including a variety of different indicators. Two types of indicators were most common in the literature, weather and the environment. We chose not to include them in our index because how weather environmental factor impact an individual's overall quality of life is not clear, and likely differs between individuals. People sort themselves into regions they enjoy and so even though a rainy day may be depressing for some, it may be encouraging or enjoyable for others. Further, an area that is usually overcast likely attracts those who enjoy such climates. We also expect the health data we include to pick up the valuable information that including pollution would provide so we exclude it in order to satisfy our rule of parsimony.

Other researchers attempted to include data that would account for the social environment. For instance, Shapiro (2006) measured the number of restaurants in an area and Giannias et al. (1999) calculates the number of professional sports teams in the city area. Florida (2002) attempts to measure many unconventional aspects of an area, including the homosexual population, the number of bars and nightclubs, the amount of nonprofit art museums and galleries, and the number of public golf courses among a host of other factors.

These other factors are seeking to measure something beyond the five common themes we found, and we do not discount their potential importance as explanatory variable in many instances but based on our reading of the literature and our analysis view them as factors outside what we term quality of life, and choose instead to focus on the common measures that have emerged in the wider literature.

With these commonalities in mind we can begin an in-depth explanation and consideration of the nature of our own life quality index. As we set aside the other category of well-being indicators, we approach measuring quality of life with five indicators: public safety, health, economic development, infrastructure, and education. Each of these is firmly rooted in the literature and constitute our jumping off point for estimating quality of life in each county of the United States. As we illustrate the elements of our model we provide theoretical justifications for why each component is an important and accurate measure for that indicator as well as justify our selection in relation to the literature that we have already cited and other important findings.

Why We Use Objective Measures of Well-Being

A few practical data considerations like data availability prove challenging when researching at the county-level and have certainly limited our ability to simply incorporate all of the indicators we would have preferred, but our primary data concern is that it be comparable between counties. Simply put, we want to be able to take the data from one county in one state and be able to make valid comparisons between it and any other county in any other state. This means we must use the "objective" data of well-being. Employing the subjective measures some scholars would be inappropriate for the purposes of our index.

Subjective quality of life does not fit well with larger measures. It may fit well enough in a survey of individuals, the micro-level, but when comparing and considering how counties differ it would be difficult, and likely impossible, to create a valid survey to measure the differences. It would be an interesting endeavor, but it seems that regional differences and other complications would make such a metric unreliable and prone to faulty recommendations. Survey results and other subjective methods for estimating well-being are not scalable in the way we want our index to be. Adding one individual's reported happiness to another is nonsensical, as economists have long argued. What are known as inter-personal utility functions are not considered legitimate and such scaling of subjective measures constitutes just such a scaling. Further a subjective measurement gives few insights to inform policy makers and politicians as they legislate.

There are many reasons for our use of objective indicators, but we recognize it is one of the principal disputes in well-being studies. Objective measures are based on aggregate population data have been advocated by such measures as the United Nations Development Program (2008) in their Human Development Index, and The World Bank (2009) in their World Development Indicators. The Human Development Index employs a wide view of human flourishing and contains: life expectancy, adult literacy rates, student enrollment ratios, and gross domestic product per capita. Similarly, the UNDP's World Development Indicators consist of nearly 700 different indicators in five different areas: people, environment, economy, states and markets, and global connectivity.

The logic behind the use of these objective metrics for well-being assumes that they are universally desirable qualities, which creates some challenges for their use. If such objective measures are meant to quantify the total level of physical, economic, and social health and thereby capture the quality of life for that place, then they must be carefully designed to actually match what individuals want and view as important for their own satisfaction.

By contrast, subjective measures, like those advanced by Brooks (2008) and Gill (1995), argue the measurement of quality of life is best suited for the psychological realm of overall happiness since it is only definable by the individual. These methods suggest posing open questions to individuals and measuring well-being through their responses. Gill (1995) proposes surveys asking respondents to respond to questions via a feeling thermometer from 0 to 100 about their own life quality.

Individualized responses like this let those answering the question apply their own weights and is therefore specific to the respondent. Although the results may be drawn together to make conclusions about the aggregate population, their true value is best attained on the individual level since responses can vary widely and skew the aggregate results. If individuals create their own weights as Gill suggests, however, it is unclear if these are truly comparable between people. Ed Diener's 2009 edited volume, *Subjective Well-Being*, covers the most important literature on subjective measures of quality of life (Diener, 2009).

Both the objective and subjective approaches to quality of life measurement have made many valuable contributions to the literature. Scholars of well-being should be careful to examine both methods or risk falling short of being sufficient for a complete understanding of the driving forces behind quality of life. Different research areas and questions will lend themselves better to one method than the other or benefit from a hybrid approach. One of the issues that seem to be at odds between them is whether to take a macro or micro perspective of the indicators. If a macro position is taken, then the objective measures seem to be a more useful tool. When a micro perspective is taken, however, then an individual level measure is more valuable.

We assert, however, that Costanza et al. (2007) rightly deduce that these differences between the two types of measuring are not as deep as they appear. They claim that these "so-called "objective" measures (of quality of life) are actually proxies for experience identified through "subjective" associations of decision makers;" and so "the distinction between objective and subjective indicators is somewhat illusory."

Costanza et al. has also been repeatedly verified. For example, a more recent paper published in *Science* by Andrew Oswald and Stephen Wu (2010) objectively confirmed the subjective measures of human well-being. They find a Pearson r coefficient of 0.6, which is unusually large for social sciences and suggests a powerful relationship, between the objective and subjective measures of well-being. This suggests including subjective measures would be unnecessary in our index since they track each other so closely.

Further, we assert that since there can never be a truly objective set of indicators created, because the very selection of some indicators and not others is subjective, the fundamental argument of quality of life literature should revolve around the nature of the quantitative data that is used, and in the justification of subjective indicators and not around if they are used at all. More specifically, if the uses of aggregate population measures are better suited for such work or if individual preference based survey data is superior.

Another aspect of the debate surrounding the objective and subjective issue focuses on the differences in what is actually being measured. The objective measures represent environmental indicators that imply the possibility of having a good quality of life; they do not assert that their mere presence guarantees it. They represent what most people see as necessary conditions for a high quality of life, but they in themselves do not represent a sufficient condition for an individual having a high quality of life. The subjective, micro measures on the other hand only measure a

person's psychological perception of satisfaction and life quality, which may be independent of environmental and social conditions considered in the objective measures. What is needed is an integrated approach that allows both measures to be used together to find any connections that exist between the two.

The Economist (2005) Intelligence Unit's quality-of-life index attempted to merge the traditional objective measures of economic and health data with subjective survey data taken as a sample of an area. They were able to successfully use both aggregate population data and survey data to draw their conclusions, although their more recent lottery of life study, sometimes known as the where-to-be-born index, returned to a solely objective methodology (The Economist, 2012). It is likely that both overall population measures and individual level preference based data are important to study the proper connections of life quality in the population as a whole, but it does complicate cross-cultural and international comparisons.

> Lieske (1990) explains that the major research issues in life quality studies have tended to revolve around its measurement, the magnitude of differences from one city to the next, and patterns of regional variation. As a consequence, most quality of life studies have been largely descriptive and either unable or unwilling to provide much theoretical or empirical insight into the determinants of life quality differences (p. 43).

An integrated technique would provide both the theoretical and empirical depth and insight that Lieske claims has been overlooked in the past literature and would allow for the formulation of a more universal view of the quality of life in target areas.

Our purpose in building a quality of life index is to explore the substantive effects of quality of life as suggested by Lieske (1990) and as we have done elsewhere (Yonk et al., 2017). We therefore chose to include in our index sub-indicators that have a strong theoretic basis for affecting the life quality experienced by individual citizens and that are objective measures. In the next chapter, we review the relevant literature for each of the sub-indicators, and explore how variation in those indicators should affect life quality.

Chapter 3
Exploring the Components of Our Quality of Life Index

As we explored the components of each indicator that would eventually be included in our index, we bore in mind our central purpose of investigating the political implications of quality of life as well as the theory behind our work. There are also, of course, statistical justifications, checks, and validations we discussed while developing the index, but the theory drove and guided our inclusions and brought us to the relevant statistical tests. Mathematical work without a guiding theory adds little of value to policy issues. This chapter builds on our previous work with a wider and better streamlined dataset, greater depth on each indicator we discuss, as well as more forms of validation. It is largely an extension of previous work where we provided fewer details and justified an earlier version of our index using fewer statistical methods (Yonk, Smith, & Wardle, 2017).

In this chapter, we explore the literature surrounding each of our indicators and provide an explanation for our approach to including or not including particular sub-indicators that the literature indicates are likely to be important to measuring life quality.

Education

Among the indicators that are most commonly associated with the life quality of an area is educational attainment and quality. The logic of education's connection to quality of life is particularly compelling as the connection between education and the future of an area is clear in the literature. For example, Baum and Ma find that areas with better education systems have higher levels of educational achievement, and largely as a result of that achievement, higher average incomes (Baum, & Ma, 2007). Beyond the income impacts of education other research has provided evidence that improved health is also connected to high education and income levels (Pincus, Esther, DeWalt, & Callahan, 1998). Beyond highlighting the importance of

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education as an indicator of life quality the results of these studies suggest some interaction between our indicators as they combine to become overall quality of life.

In our quality of life indicator measuring education we are interested in the access to and availability of educational services in each of the counties we study. We are particularly interested in the availability of higher education services as the wide literature on the subject to higher education strongly suggests that the benefits of higher education to individuals are substantial, long lasting, and strongly associated with both higher incomes and subjective well-being. (Baum & Ma, 2007) Our measure of this availability measures the direct access that individuals have to these services. Building from the assumption that proximity that higher education makes it far easier to take advantage of higher education we attempt to measure the direct availability in each county.

As the market for higher education and the overall education system becomes competitive new attempts to capture previously untapped markets and create new technologies and efforts are made. All of which serves to make higher education available to increasingly isolated places and to make the lack of availability increasingly stark in comparison. (Hanna, 1998).

Again competition and the resulting potential for increased availability led us to include two final access measures beyond the ubiquitous public K-12 education that is available in all of the counties, in at least some form. We also include the presence of charter schools which are publically funded but not tied to the standard public school system and private educational alternatives. We had hoped to include information about home schooling and the now emerging e-schools, but limitations on the data make that inclusion impossible. It will be a fruitful place for later scholars. Information about the location of charter schools is from the annual survey done by the National Center for Education Statistics (NCES) and our measure of private schools is also obtained from NCES, combined with US Census data. All of our other measures of education services are obtained from the US Census data. We simply measure the presence or absence of a charter or private school option in the county as they are a proxy for efforts of the local community to provide educational services outside the standard system.

Charter and private schools are clearly not designed to be used by every resident of a county, and many perhaps most residents would continue to choose public schools in in the face of greater availability, those who enroll their children in them generally report that their availability of large importance and tie high academic performance to their children's attendance. We take no particular position on this claim other than to observe that the presence of choices within the education system is healthy as it usually fosters competition (Forster, 2009) and empirical work observes increased efficiency with funding as some confirmation of that theory (Herzberg & Fawson, 2004).

In our initial discussions of service availability in education we wanted to look at the services that are offered in public schools in order to determine if the schools are fulfilling the educational needs of the largest number of students possible. One of the programs that we sought to include in our measure was the availability of college preparation courses like Advanced Placement, International Baccalaureate, or

concurrent enrollment for college credit while still in high school. With this we could capture a measure of the needs fulfillment for advanced students that could be held back from reaching their potential if these courses are not offered and they are kept with the bulk of the students in classes that don't challenge them. The realities of data availability, however, eventually led to exclude this measure from our final index. We do, however, believe that if better data become available a measure of like this has the potential be a valuable inclusion in the index.

Similarly, we also wanted to capture a measure of the needs fulfillment of the students in a school system that may need extra assistance to succeed. The availability of a Limited English Proficient (LEP) program would be one such measure to account for the ever-growing number of students who need extra help with English due to the diversity of home-spoken languages. In addition, we would have liked to measure the availability of special education services to help those students with special needs, but again data availability led to their exclusion for our final index.

With our combined measures of service availability, we are able to determine if an area has the appropriate groundwork laid in order to produce a quality education. But, even with these programs in place and available, they still require sufficient funding to operate. Many areas have a need to attract and retain teachers that can only be fulfilled when there is adequate funding being given to teachers who are incentivized to work harder (Prince, 2002). In addition, the funding should pick up, though not as directly as we would like, the extent of extracurricular and advanced classes since they both entail additional funding and expenditures. We capture an area's funding effort for educational services by considering spending in three different educational areas: per pupil spending by local, state and federal government for education services, the percent of education related spending from tax revenues, and education payroll.

Per pupil spending by the state and federal government for education services is obtained from the NCES. This data reveals the funding that are allocated for the educational needs of teachers and student necessary to receive a high-quality education. Since a significant portion of school funding is derived from local taxes, our second measure of funding for education deals with the percent of education related spending as a percent of tax revenue. This data was obtained from the U.S. Census and proxies the dedication of local government officials to the education systems in a county by examining their propensity to dedicate a larger portion of local tax revenue to it.

Finally, using data from the U.S. Census, we include a measure of total education related payroll spending in both the public and private sectors. This allows us to add to the previous measure of per pupil spending by also looking at the private sector's contributions to the funding effort in the way of employee compensation. Education payroll positions also can include a much wider range of employees than just teachers and a measure of the funding in this area should also have impacts on the quality of life in a given area.

Area's with good schools and a well-functioning and high-quality education systems have been found to be more likely to have positive outcomes from that system.

(Baum & Ma, 2007). Further our own view of the importance of life quality is similarly associated with these outcomes. We measure these outcomes using several indicators that are focused on the education system's impact. First, we explore the enrollment of high school aged students to explore how many of the area's children are exiting school without receiving a high school diploma. This measure is the dropout prevalence in the local secondary schools. A student is defined as a dropout if they are between the ages of 16 and 19, have not graduated from high school and are not enrolled. Those who this definition applies to have either failed the system or have been failed by the system and in both cases, would not be associated with high quality of life if those their numbers are substantial.

Our second outcome measure is the percentage of citizens, primarily of college age 18 to 25, enrolled in higher education. We use U.S. Census data to get this indicator that measures all the previous year's high school seniors who are enrolled in higher education as well as others who are enrolled in higher education in the county. This depicts both the level of high school students going on to attend college as well as the total number of people enrolled in higher education in a given area.

The final outcome that we captured by this method is the education level of the population in the given county. The U.S. Census provides data on: the percent of the population that has graduated from high school, the percent that has graduated college, and the percent that has obtained an advanced degree.

Using these data, we determine the level of education of the whole community, working backward from those percentages and using the county's population to arrive at a measured that estimates the average years of schooling. This measure aids our understanding of how much an area values education, its impacts and the quality of the school's. In line with the broader literature on the effects of education, we expect that higher average years of schooling will correlate with higher life quality.

Our overall indicator for education is built from educational availability and access, education funding, and education outcomes. When these measures are scaled together it provides a theoretically grounded metric of the education system in a given area that should be associated with the quality of life in a particular area. We assert that this measure accounts for the quality of the education system of an area since, and concur with on Lyson's (2005) assertion, education "serves as an important marker of social and economic viability and vitality".

Public Safety

There are few indicators that are more commonly cited by those who discussing their community's overall quality than those that are commonly associated with community-wide public safety. Area's that have high levels of crime, lack fire protection, and that have deficiencies in other services designed to protect the property and personal security of individuals are unlikely to be foster high quality life. As is clear from the literature we reviewed, any metric of life quality must include at least some measure of public safety and the related concepts, particularly as public safety

involves the prevention of and protection from potential occurrences that could jeopardize the well-being or security of the general public directly.

Our understanding of public safety is fundamentally tied to having the services available and the benefits they provide. We focus primarily on two sub-indicators. First, the availability of police and second, fire protection in each area. We found that a dichotomous variable representing whether or not the services were available was not adequate nor useful when we were compiling, testing and refining the index. The underlying theory still speaks strongly to its importance but, ultimately, we decided to include only the funding effort data, which captures availability and intensity, in the final data analysis.

The availability of fire services throughout the county are an important part of the public safety particularly as they related to the protection of both life and property from fire-related perils. One illustration of this reality comes from 2007 when, "an estimated 1.6 million fires… killed more Americans than all natural disasters combined (U.S. Fire Administration, 2008). The increased prevalence and efficiency of fire protection across the country has generally led to a reduction of the number of and loss from fire.

The literature has further discussed the importance of fire protection to the protection of life and property Shoup and Madema (2005) further identify fire service's positive role in contributing to economic development:

> Risk, in the sense of relative dispersion of possible outcomes of a venture, is reduced for almost any venture by an increment to fire protection service. All in all, fire protection is clearly one of the most important stimuli to economic growth.

The simple availability of local fire services in each county, though likely necessary, is clearly an insufficient condition for maintaining public safety, hastening economic growth, and improving the quality of life for county residents. Instead, the form and intensity of that protection is likely of similar or greater importance.

Like fire protection the presence of policing entities in counties is an important contributor to the prevention of various types of property and violent crimes towards its residents. Police persons charged with maintaining order, enforcing the law, and preventing and detecting crime have a clear role in the well-being and safety of the citizens in their area. Mladenka and Hill (1978) discuss this realty in their analysis of the distribution of police services and conclude that distributing police services evenly among states in order to maintain public safety is important. We build in part from this logic, but rather view the importance of basic services distributed with marginal increases in police effort as being likely related to positive differential outcomes.

In an analysis of police protection and efficiency Gyimah's (1989) uses the crime rate to measure community safety. Although seemingly so obvious that it is nearly a truism, this reasoning and data are important as they empirically show that when "the crime rate is lower in community A than it is in community B, then it is reasonable to postulate that community A is safer than community B."

It is from this simple analysis and theory, that we and others deduce that well-being is associated with a greater amount of police service protection at least to

some limit where the law of diminishing marginal returns becomes active. It is not obvious, however, where that inflection point is. Like others, we use increased spending as a metric for better police protection. Further we believe that the relationship is unlikely to reverse direction in the relevant range. That is, we assume more police are always likely to improve safety because of our theory and the literature we've reviewed, but also believe that additional spending quickly becomes subject to diminishing marginal returns.

Further Cebula and Vedder's (1973) work find the level of crime affects individual's decisions when migrating to new areas. They find that "Higher crime rates should lower net benefits obtainable from migration in a number of ways: loss through theft of property, higher insurance rates, an increase in fear and tension, etc." Extending this work to quality of life, we are confident that the quality of an individual's life is usually lower in counties with higher crime rates. However, despite our belief in this regard there is also ample evidence to suggest that the way in which crime rates are reported, especially in smaller rural, and dense urban counties leave the data lacking in both its completeness and consistency across jurisdictions. Thus, despite our belief in it's likely importance, crime rates are not included in our final index calculations due to these problems in the data. Instead we rely on the established link between police spending and crime outcomes, that while not perfect is largely consistent.

The presence or absence of police and fire protection is important but only partially sufficient to provide public safety services. Simply having a police or fire force in an area is not sufficient to achieve better outcomes if those services are chronically underfunded. Instead the availability of funds to provide those services looms large in their ability to provide positive outcomes. As such we consider the availability of funds on a per capita basis for both fire and police services. We do this for two primary reasons. First, while spending of this sort is clearly subject to the law of diminishing returns, we believe that as more is spent per person on fire and police services, the higher public safety is likely to be even though the marginal dollar will not have the same direct impact as the first dollar spent, past some threshold. Secondly even in areas with relatively high crime rates, the residents in those areas view increased police spending as being a positively related to better public safety outcomes. Further the wider literature reports that spending is likely to be correlated with a number of other public safety outcomes for which the data is unavailable.

Charney (1993), for example asserts that; "public [safety] expenditures reflect both the quality and cost of providing public services," even if "public [safety] expenditures are not a perfect measure of the quality of public services." It is, however important to note that that county with high public safety expenditures could simply be an area that demands more safety spending due to higher crime rates, "rather than measuring a high feeling of safety". Despite this potential problem and the difficulties in measurement, we are satisfied that county residents will still likely have a greater amount of fire and police protection if more money is spent per capita for these public services. Skepticism, is, however, warranted.

The expenditures on fire and police protection also act as proxies for other services that are not directly measured in the data. These other services include spending for things including such as ambulance services and correctional facilities. The wider literature and our own observations leads us to believe that a county that puts a high priority on public safety by spending more per capita on fire and police services will also likely be spending more per capita on other public safety services.

One example helps illustrate our thinking in this regard. In rural counties, the availability and funding effort for ambulance services is closely linked health and life expectancy of its residents through its role in maintaining the life of the injured or dying until transported to the nearest hospital for emergency care. Stults, Brown, Schug, and Bean (1984) explore communities served by a basic ambulance service versus advanced ambulance care a difference that occurs generally as a result of funding differences. They found that those communities with only basic ambulance services, have a significantly lower survival rate.

Our reading of the literature and the theory we derive from it indicates that public safety is a crucial indicator in measuring quality of life. Further based on our work with the available data, we believe that the measurement of these services that are designed to protect the security of both life and property of residents is necessary in order to have a valuable and accurate quality of life index.

Infrastructure

There is little doubt that infrastructure functioning effectively is an important part of any community, and our attempts to measure that functionality is at the root of our Infrastructure indicator. We define infrastructure as the organizational, and structures necessary for a community to function both economically and for the necessities of daily life. A basic infrastructure is necessary for services such as health care, education, and public safety but also to economic transactions and development. Further, infrastructure allows individuals to act on their preferences for goods and services across space and time. Given the clear importance of infrastructure to the basics of daily social and economic life failure to include a measure of infrastructure in a quality of life index would be a serious error.

The goal of our inclusion of a measure of infrastructure in our index was to capture the various types of infrastructure that are necessary for individuals to have the opportunity to enjoy the other parts of our conception of quality of life. We measure infrastructure using both a metric of service availability and of funding effort. To do so we include measures of both the existence of the infrastructure as well as the funds devoted to its maintenance, replacement, and expansion. Taken separately neither measure would provide a full picture of the infrastructure of a county.

In measuring infrastructure, we could include a variety of public services. Our review of the literature and observations of the services that might best proxy for the whole suite of infrastructure identified three indicators for which there was good data availability and which are closely tied to quality of life. We start with the

previous work in this area that has focused primarily on the provision of public or quasi-public type goods. These goods are generally represented in the form of highways or similar public works. Our own view of infrastructure is wider than these limited definitions. We recognize the importance of public and quasi-public goods, we also view toll and private good as part of the infrastructure of a county but their inclusion is hampered by data availability issues. In building our infrastructure indicators we attempted to be mindful of this expanded definition.

As a result, the three indicators we chose were—culinary water, grid fuel, and telephone penetration. In each case the data allow each of these indicators to be measured as a percentage of households that have these services available in their homes. Using a penetration metric like these, which focuses on end consumer access as a proxy for general service availability, reveals a snapshot of the development of infrastructure in a county. A second advantage of penetration metrics like these is in their ability to ascertain and differentiate between areas where most residents do not have access to the service and areas where penetration of the services is high.

Our first measure of availability is that of domestic potable water from a communal water source, also known as culinary water. Few innovations have done as much for life quality historically as the provision of clean potable water, and remains of significant importance to well-being. Culinary water used for human consumption or use in the preparation of food, allows the reduction of disease and eliminates the need to locate water on a regular basis. We use the percentage of homes in a county with direct access to culinary water in home from a common system. These systems are generally provided as quasi-public goods, with local governments as the most common provider. That households with culinary water communally available will have a higher quality of life and that counties with higher percentages of culinary water penetration will attract more residents and more development has been found by numerous scholars. For example, Howard and Bartram (2003) support this reality and find that as culinary water penetration increases improved public health and sanitation results.

Further the penetration of system provided culinary water is proxy for other services in a county that might also be termed quasi-public goods. Because grid culinary water is primarily a government service, we assert that a greater percentage availability of grid culinary water in a particular county also is likely to translate to a greater amount of other government provided infrastructure in that county. Two of these services are of particular interest in our view, municipal solid waste (MSW) services and sewer services. The availability of both of these services is not recorded in the data. They are however important quasi-public goods that are important to life quality, and are highly correlated with culinary water penetration. We therefore view culinary water provision as a proxy for the provision of MSW and sewer service. Our belief is that counties with grid culinary water are also likely to provide MSW and sewer services as well.

Sewer systems collect sewage waste from local buildings and are later used to either dispose of or treat the sewage for sanitary purposes. Having available sewer systems provides greater sanitation and health to the community. Likewise, MSW

services are also contributors to greater sanitation and health. A major source of water used to create culinary water is groundwater, and according to Miranda, Everett, Blume, and Roy Jr. (1994), MSW and sewage services are important in reducing groundwater contamination as well as reducing other solid and hazardous waste material.

Our second infrastructure availability measure is similar to culinary water in that it is the penetration of a grid provided service. We are interested in the penetration of grid fuel, which is almost universally provided by private corporations rather than governmental entities. The penetration of system provided fuel for heating and cooking is a significant measure of county's development. Generally, the fuel provided is natural gas, although a few other fuel types are in limited use. Access to these fuels without having to actively seek the fuel is a positive measure of the resident's life quality. All residents must do for these services is simply adjust a switch and pay a monthly bill.

The importance of well-organized systems for providing these fuels was highlighted by Rothfarb, Frank, Rosenbaum, Steiglitz, and Kleitman (1970), who find that the greater availability and reduced costs provides substantial consumer benefits. An example of grid fuel benefits was illustrated by *The Cordova Times* of Alaska. The author expands on the potential benefits of expanded grid natural gas —such as convenience, versatility, safety, improved air and health quality, value, and others— when a grid fuel system in the rural Alaskan city was implemented (Avezak, 2009).

The last of our service availability measures for infrastructure is the penetration of household telephone service. Despite recent developments which have reduced the value of this indicator we believe that the penetration of the availability of telephone service remains a useful measure. Our thinking in this regard is highlighted by Hudson (1995) who, despite writing at a time when landline telephone service was more important, still well illustrates describes ways that well-being benefits from telecommunication availability:

> Telecommunications is a tool for the conveyance of information, and thus can be critical to the development process. By providing information links between urban and rural areas and among rural residents, telecommunications can overcome distance barriers, which hamper rural development. Access to information is key to many development activities, including agriculture, industry, shipping, education, health and social services.

Absent access to telecommunications in its most basic form residents are unable to receive information important to both social and economic transactions. Further the availability of at least landline telephone service allows for minimum speed dial-up internet access. Access to even this minimal internet service provides important communication and information access. Strover (2001) states the significance of "adequate connections to advances telecommunications infrastructure and services [for] rural communities…to be able to fully participate in the emerging information economy." Despite the fact that a large number of individuals have or are switching to better services, such as broadband and cell phones, we do not use measures of these services. First, simply because they do not exist, but primarily because basic telecommunications access is still a meaningful measure of the most basic access.

In future work, we hope to include measures of these factors. For example, the number of cell phone towers in a county or the extent of broadband penetration.

Our selected proxies and their penetration rates are an important part of the development of infrastructure in a particular county, but they represent only part of the larger story. To better understand infrastructure, we examine the funds dedicated to provide infrastructure. While our first set of measures speaks to the level of development of a county's infrastructure, our second set of measures speaks to the financial resources available for infrastructure and how those resources are being used.

To better understand the infrastructure of each county we explored the funding devoted to infrastructure development and maintenance. Just as with our earlier funding measures, we use the per capita spending to understand the investment in this case we also use the spending per square mile of land in the county as well. This approach allows us to account for both differences in geographic size and in population, both of which are likely to result in differing infrastructure needs and approaches. We use capital bonding numbers and transportation expenditures to proxy for other infrastructure goods. Capital bonding provides information about longer-term needs while spending is focused on more immediate needs. Taken together they illustrates the level of investment a county is making in infrastructure.

Our spending measure is focused on public transportation spending measured on a per capita basis. Because we use a general measure of this spending it includes all of the most common transportation approaches used by communities. These figures include spending on subways, buses, streetcars, light-rail transit, and the most common form, highway funding. Spending on public transportation is likely to be related to higher life quality, through its direct effects on business, recreation, social, emergency health, education access, and general ability to travel.

The economic development impacts of transportation infrastructure spending in is illustrated by the impact of highway spending allocated by each county. In an economic growth study by Dye (1980), he finds that "highway spending emerges as the strongest correlate of economic growth." Dye argues that the growth occurs primarily because of highways ability to facilitate commerce and transportation. A later study by Weisbrod and Beckwith (1992) found that a well-developed highway system allows the "expansion of existing business, attraction of new business, and tourism growth" as well as "increasing business productivity over time associated with reducing shipping costs." Like Dye they argue that the reduced travel time that better highways provide for residents' transportation has a substantial impact.

In addition to these direct effects there is at least one important additional transportation concerns that is not directly measured in the data, the availability of transit services. As funding increases for transportation infrastructure, especially per capita spending, it is likely that at transit services are part of that increased spending. The availability of local public transit is at least potentially related to quality of life as some county residents are likely to lack access to private transportation options. Baum-Snow, Kahn, and Voith (2005) illustrate the potential of public transit to impact life quality "[B]etter transit may disproportionately improve the quality of life and the quality of job opportunities… Public transit potentially increases the access of the poor to better labor market opportunities."

Health

The majority of the quality of life literature that was reviewed for this study includes a measure of health as an indicator, and its inclusion in our own index is theoretically important. It is untenable, or difficult at best, for someone to have a good quality of life if they are living in unhealthy conditions or do not have access to quality healthcare. Maslow (1943) underscored the significance of good health when he placed physiological needs at the base of his hierarchy of needs in his explanation of human motivation.

As we began our review of how health was measured in the wider literature we found one interesting debate that help shape our view of health as an indicator. This debate centered around whether healthcare was primarily a luxury or normal good, Newhouse (1992). Those claiming healthcare as a luxury good include Hitiris and Posnett (1992). Their analysis finds that per capita health expenditures follow GDP fairly closely and as a result conclude that health expenditure consumption is elastic responding to changes in income. They go further and claim that healthcare spending is elastic enough to be considered a luxury good. Their findings could have important implications on quality of life if healthcare is as they assert as a luxury good, much of the spending in health care is likely doing little to improve quality of life. As a result, simply increasing funding may not necessarily result in an increase in care that then improves well-being.

Counter to this claim of heath care is a luxury good are those whose research argues that health care represents a basic human need and as such must be a necessity and an inelastic good. In one good analysis Parkin, McGuire, and Yule (1987) push back on the luxury good claim by asserting that is only viewed as a luxury by incorrectly applying microeconomic data to a macroeconomic problem. Parkin et al. also claim increased spending will be closely related to better health outcomes. In part, he and others arrive at this conclusion from an assumption that the health needs for many individuals are not being met in the current system. As a result, the demand is not in fact elastic but rather constrained by lack of resources.

We find some of both arguments compelling and like Getzen (2000) who views health care expenditures as both a necessity and a luxury that can vary with the level of analysis arrive at a middle ground. At the macro level, due to the law of diminishing marginal returns health care spending rapidly comes to act like a luxury good. At the micro level, however, we believe that this is not apparently or axiomatically true. Instead healthcare is likely a necessity at lower levels of spending where at least a certain level of care is essential, and thus inelastic. Increasing levels of spending will eventually reach a point where the expenditures are better considered a luxury. Routine medical procedures and checkups are necessities for well-being, but physical enhancements such as plastic surgery are not.

Unfortunately, we are not at all certain where this point of diminishing returns to health-related spending is. As we expect that there is a basic level of health expenditure that is best classed as a necessity to a high quality of life, we designed our indicators with this reality in mind. Our goal became to capture the aggregate

healthcare system in the areas in order to determine if it affords individuals at least the necessary level of care needed and, if possible, their desire for healthcare as a luxury good. This is also justified by our belief that, even as a luxury, well-being is likely improved by access to even unnecessary procedures.

Our aggregate measure of the health system in US counties, is focused first on the availability of health care workers, and as such we include physicians and surgeons per 1000 and healthcare workers per 1000 to asses this availability. In our first attempt at a measure in this regard we had also hoped to include hospital beds per 1000 residents. However, since health care requires specific and well-practiced skills, we assume as the number of workers increases in a population they are more likely have facilities to work in and serve as a useful proxy to that availability. This measure is sufficient to furnish a snapshot of the availability of healthcare facilities that we believe to be most vital to a good quality of life.

That there are other factors that are important to the health of a population is clear and the literature provide a clear accounting of those factors. They include, socioeconomic status, educational attainment, and cultural factors (Pincus et al., 1998; Grossman, 1973). Education, Grossman (1973) finds, is the single best predictor of health outcomes while Pincus's conclusion, is that socioeconomic status is the driving force behind health outcomes, overriding even the ease of access to that care. While their findings are interesting, the greater part of the literature and even their own secondary findings indicate that access to care is also important to health outcomes. Between our other indicators, the index we develop also captures these other factors as well.

The presence of healthcare facilities is of only marginal value if people do not have the resources necessary to be treated. In the case of health, that resource is primarily health insurance. We craft a measure of health insurance coverage from the U.S. Census data. This measure includes both private insurance, Medicaid and Medicare, and other programmatic insurance provided by government agencies.

The flaws in the United States healthcare system are well-documented and not the focus of our study. We do address one of the most common issues that is directly relevant to our use of insurance coverage as a measure of health, overconsumption (Feldstein, 1972). Though we acknowledge the problem of overconsumption that is created by separating the user from the payer, we believe that insurance rates in a county are useful proxy for those in a community that are having their basic health needs met. In this regard, Davis, Gold, and Makuc (1981) find that the best indicator of whether health needs met is their economic status which is directly tied to health insurance coverage (Davis et al., 1981).

Our second indicator is focused on health outcomes. Some scholars argue that the unique circumstances of modern life require new measures of health outcomes. In particular their argument is that traditional measures of health that have mainly dealt with morbidity and mortality are insufficient and that new measures must and also take into account "diseases of civilization" like obesity and depression that are more recent phenomena (Hunt & McEwen, 1980).

It is our view that while these may be of substantial importance to quality of life including them in any meaningful way in an index is nearly impossible as the data

are not consistently available. Hunt and McEwen (1980) in particular raise important concerns but those concerns almost certainly differentially affect individual populations and using them in an overarching measure given that difference is problematic. While our approach is not capturing the complete picture, it does capture a sufficient portion of the whole system to be a useful and important metric.

Despite having readily available health services it is possible that the quality of those services may be not meet the needs of patients. In common with our other indicators with the other indicators like education and public safety, we also measure the funding effort in the area of health. We include the overall per capita health expenditures by government agencies and the total amount spent on payroll on health care professionals in our measure.

The costs of health-related services are substantial. The Centers for Medicare and Medicaid Services in the Department of Health and Human Services places the total yearly spending in the U.S. around $3.2 trillion or nearly 18% of the United States GDP (Centers for Medicare and Medicaid Services, 2015). Examining the funding at a county level uncovers the provision of health services in our areas of interest.

As we noted earlier, the amount of funding does not guarantee quality since there is a substantial potential to waste the funds after they reach the point of diminishing returns. The literature finds that the healthcare industry is home to massive rent seeking and waste (Evans, Barer, & Marmor 1994; Reinhardt 1987). This however, does not diminish the fact that a certain level of funding is needed to maintain a basic level of service. Generally, we believe greater amounts of funding translate to meeting those basic needs more effectively and for more people. Waste is always a concern, however, that future scholars of quality of life should examine.

Despite these important warnings a large part of the literature has found that higher expenditures on health are at least correlated with better outcomes. (Or, 2001). Poland Coburn, Robertson, and Eakinand (1998) also find that higher expenditures on health produce better outcomes, but we skeptical of their preferred outcome simply increasing government control of the wider system. Indeed, we have no reason to expect that increased government control of the funding would not be just as wasteful as the current system. We believe that our measurement of the funding effort for health services provides the reader with an overview of the system without making any judgments on how the system should be organized.

In the end, our selection of indicators occurred because we believe them to be the best way of capturing the availability of and access to health care. They cover both the causes and the consequences of a good health system and bring to light the relationship between health and quality of life within a county.

Economic Development

Our measures of economic development examine the ways that counties foster employment opportunities that are well-paying and secure. It constitutes the institutional efforts that promote economic betterment and the social organizational

changes made to promote growth in an economy (Yonk et al., 2017). We include variables that relate to economic outcomes (income and employment levels), availability of services, and the availability of capital.

Having a greater number of businesses means better access to the benefits of the services they perform and having easy access to jobs for employment. We focus on the total number of employers and the number of new businesses per year in each county. Recessions and booms will both impact those factors and so we can pick up both economic upturns and downturns. We will be able to see when there are net increases in businesses in a county and net losses which serves as a valuable metric for economic health.

For good reason, employment rates are commonly parts of quality of life indexes. Downward spirals for counties can occur when there are few employment opportunities. Fewer employed people means a contraction of demand for the goods and services that other businesses provide and can make the employment worse in an area. Though schools of thought diverge on the methods of improving it, employment is rightfully a hallmark of healthy economies. Our first measure in this regard is the employers in each county as an economic quality of life indicator because as more employment opportunities are available residents are better off and able to satisfy their needs and wants (Yonk et al., 2017).

We use data that contains information on the total entities reporting paid employees so we have the widest possible view of employment. Our goal is based in part on Wenneker and Thurik's (1999) assertion that small firms have significant positive economic benefits through their ability to be "routes of innovation, industry dynamics and job generation" and because they display "a lower propensity to export employment, a qualitative change in the demand for capital, and more variety in the supply of products and services."

A second marker of well-being is in the change in the number of businesses each year. The creation and development of new businesses is one of the most basic factors that drive economic development (Buchanan and Ellis, 1955). As new businesses are founded opportunities for employment likewise increase and, in general, having new firms emerge indicative of greater capital availability. Each of these factors is an important indicator of economic vitality. Using data on the total number of businesses in each county we calculate the number of new establishments and include it in our index (Yonk et al., 2017). We believe that as this measure of the entrepreneurship increases it constitutes evidence of a dynamic economy that can best serve those within it (Postrel, 1998).

When counties face reduced employment opportunities, due to low business creation and poorly diversified business within a county, the necessity of migration or increased travel for employment is likely. To measure these possibilities, we used data on the number residents who travel for employment and on the length of commute time. Our measure of residents who must travel outside the county boundaries and the length of commute is based on the notion at as an increased number of county residents must travel outside of the county for employment is negatively related to economic development in the county.

The effects of lengthened commutes have been well explored in the literature. Khan, Orazem, and Otto (2001) link increased commutes to economic impacts and point out that "if economic growth elsewhere raises an individual's earning prospects, the individual will move, but if the individual can exploit economic growth elsewhere by commuting, he will not need to move to gain from the expansion." In their exploration, they track eight Midwestern States county level economic development. They find that county population grows when the economy grows and when adjoining counties have successful economies. They even find that the economic growth of counties two counties away is related to the population of the county. Shields and Swenson (2000) explore Pennsylvania counties and find that employment and wage are balanced by commuters against housing prices and travel costs.

The amount of employment opportunities for county residents is obviously related to the number of employers, even though merely examining the absolute number may obscure the role of large employers in the economy. More employers are also related to better access to more and a greater diversity of goods and services. If residents must commute long distances or leave the county to find employment, that reveals the limited number of economic opportunities for employment in their home county.

The levels of economic diversity, the size of per capita income, and the unemployment rate constitute our three sub-indicators for our measure of economic development. Our first measure of economic diversity assumes that as a county's economic system become more heterogeneous, the healthier economically that county will be. One example of this is readily found in the boom and bust problems faced by many counties where coal mining, or fossil fuel extraction is nearly the sole industry and source of employment. If a sudden change in the market occurs or resources are exhausted or even if a natural accident prevents continued extraction, there will likely be dramatic effects on well-being in that county. There are a growing number of reasons to believe the Appalachia area is suffering through one of these events, though popular accounts also refer to social decay and health problems such as addiction (Vance, 2016). Phillips (1995) illustrates this example in their finding that rural areas are far better off when they diversify their economies since they are, at least in part, able to avoid cycles of booms and busts.

To measure economic diversity, we use Hachman's (1995) approach which reveals the full diversity of economic activity by industry, and our view is that a county with greater diversity is likely to have increased employment opportunities and quality of life than those with few industries active in the county.

Our second measure is per capita income. Including income at the per capita level is commonly and consistently used throughout the quality of life literature and is often a proxy for the concept as a whole. Those interested in life quality use it for good reason, it captures the both the income and wealth of a county while at the same time accounting for the population of the county. Despite its strength and importance is does, however have its limitations (Buchanan, 2001; Alpert, 1963), namely that it does not account for wealth disparities that may exist. We view this criticism of per capita income as potentially important but note that our index relies

less on per capita income than many others as it is embedded within other important values. Our index is, therefore, less likely to be driven by income than other indexes. A fruitful future research agenda could devote itself entirely to defining how wealth is separate from the other areas and the relative importance of wealth to other factors of well-being. For example, is wealth a prerequisite to a high quality of life? Or, paradoxically, is wealth a detriment to well-being? This question would need investigation at both the macro and micro levels as individuals may benefit from wealth through different causal pathways than counties, states, or even groups of individuals.

Although there are problems with income, it is still vital to include in our index and is supported by the plethora of research on its relationship with life quality. The general reasoning is that as income increases so does the purchasing power for both necessities and luxuries and serves as a hedge against risk. Much of the research follows Lucas's (1988) argument that income is the best proxy for economic development, but this must be moderated by the arguments of those liker Alpert (1963) and Constanza et al. (2014) who demonstrate that it is not an all-encompassing measure of life quality despite its preeminence. Our own index more closely resembles Alpert's who include a variety of economic measures including, dynamism in business, continuous process of capital accumulation, and a number of others. In the end, our own index reflects a similar approach per capita income is important, but not the single factor in determining quality of life. Our earlier critique of GDP as a metric of quality of life should not be considered as a disavowal of its utility in social science research. Rather, we argue that the use of solely GDP should be thoroughly interrogated whenever employed. GDP, and any other single input measure of well-being, is likely appropriate and satisfactory in many cases, but inappropriate in just as many.

Next, we include the unemployment rate as it is often included in studying well-being and for good reason as we noted earlier. Counties with low unemployment rates are likely to reverse the doom loop described above as more opportunities become part of virtuous circle where employment increases and so do does purchasing power and ability of residents to meet their own needs, all of which feeds into a high quality of life (Yonk et al., 2017).

Finally, the importance of capital availability to economic development and life quality is difficult to overestimate. To measure this key concept, we include total deposits in commercial banks, manufacturing capital expenditures, and total annual payroll of all industries. Access to capital is a major factor in the engine of economic growth. The availability of capital represents the ability to hire workers, develop infrastructure, as well as to invest in new businesses.

Examinations of local commercial bank deposits have linked them to greater funds available for entrepreneurial activities. Further, these funds are also available to increase business investment and for private investment on homes, home improvements, and automobiles. A primary study on this link explains the relationship by emphasizing the effects of bank deposits on "creat[ing] loanable funds that could help regional entrepreneurs invest and grow further," (Low, Henderson, and Weiler

2005). Local communities benefit greatly from these funds, and without them, new businesses growth is unlikely.

While simple capital availability is important to economic development, its availability does not indicate that it has been put to productive use. There is a multiplicative effect from the effective deployment of capital. Investing in failing businesses, for example, is unlikely to net any improvements in well-being. As we have done in prior work, we study this capital activity by including a measure of manufacturing capital expenditures (Yonk et al., 2017). These expenditures demonstrate the capital being put to use and illustrates how businesses actually apply their capital.

The last measure we include of capital availability is the annual payroll across all industries as evidence of industry growth or decline. Greater payroll indicates economic expansion that is generally related to higher quality of life. Payroll is also a proxy of the quality of human capital. Employees with higher degrees and greater work experience expect to and in practice receive higher wages. When payroll increases the ability of employees to save and engage in private capital investment also increases. Eberts and Fogarty (1987) note in an influential paper for the Federal Reserve Bank of Cleveland that "as private investment increases, demand for labor and thus payrolls also increase, expanding the income of the local economy."

These indicators together constitute a broad measure of economic well-being and thereby quality of life for a community. Our three sub-indicators of service availability, economic outcomes, and private capital availability each measure the advantages of robust economic development on quality of life (Yonk et al., 2017).

Our Indicators and Index

Each of indicator and sub-indicators we review in this chapter represent our best attempt to capture and define the concept of well-being. It is informed through our review of the literature and each inclusion bears a strong theoretical justification for their place in our index. Despite our belief in the validity of the inclusion of each of the indicators and sub-indicators, it is useful for the reader to pause and reflect over Nobel winning economist James Buchanan's (2001) exhortation against using any single standard for evaluating the world,

> Even [Adam] Smith, however, is subject to criticism in his selection of the title of his treatise. By calling attention to the wealth of nations, Smith may be interpreted as setting up a single-valued criterion by which the functioning of an economy might be measured...

Models are often focused on only a single factor of a complicated world and it is crucial that those using them understand that there is much missing from any model or index. We are cognizant of this criticism and encourage those who might use our index to bear it in mind as well. Though we have endeavored to craft an index that is broader and more granular than the already existing measures of well-being, it

most certainly is not a "single-valued criterion" on which to rest an understanding of life quality. Rather, it is best viewed as one tool for examining well-being.

In the next chapter, we turn to detailing the construction of our index. As such it is unavoidably technical. Those interested in the scaling techniques and replicating our methods will find it illuminating, while those less interested in these questions may wish to proceed past it and refer to it as needed for greater clarification of questions on the methods employed and the approach used to create the index itself.

Chapter 4
Constructing a Measure of Well-Being

Any index's quality is based on its contents. A good index is based on what matters, clearly delineates what the data sources are, and the methods used in creating the index. The saying, "garbage in, garbage out, is common among social scientists who either work with or critique indexes. Because we define quality of life as, "The measured fulfillment of human wants and needs," determining how and what to include is of particular importance. Including ideas that are incorrect, garbage, in our index will produce only one thing, more garbage. It is easy to make an index, but it is tremendously difficult to build a valid one. In fact, it is likely impossible to have a perfect index, which is part of the reason we include only data that is widely and freely available because we think any other index based on private data is too much of a black box to rely on in policymaking or scholarly analysis. Our index, like any other, is certainly imperfect. We console ourselves with a firm belief that scientific progress is largely found in marginal improvements to existing models and methods.

The plethora of existing quality of life scales highlights this problem of inclusion and exclusion with significant clarity. The substantive difference between existing indexes is focused on what the authors chose to include, what they chose to exclude, as well as how they weighted the importance of the included variables if they believe some variables are more important than others. Indexes, much like economic models, are likely to be good for one purpose and in one area and in asking only a single question. The economic modeler's refrain seems equally applicable to indexes as well, "It is not *the* index, it is *an* index," (Box, 1976; Rodrik, 2015; Rubinstein, 2017).

The methodological decision to operationalize and develop our understanding of life quality as an index, is we believe, the best approach to understanding the concept. As such, we substantially agree with many of the basic methodological choices made by previous scholars. Using indexes to measure otherwise airy and difficult to limit concepts is well established throughout social science. It allows the large number of variables that explain both individual and aggregate human behavior, to be numericized, and then included in statistical analyses. Numerous scholars,

R.M. Yonk, J.T. Smith, *Politics and Quality of Life*, SpringerBriefs in Political Science, https://doi.org/10.1007/978-3-319-72571-0_4

organizations, and a nearly innumerable number of scholarly articles use data in this way. From Likert's (1932) Scales of Attitudes, to measures of democracy (Freedom House, 1995), and of course the plethora of quality of life measures we have reviewed in detail all attempt to do just this.

The two most common criticisms of indexes are not to be underestimated however well-established the use of indexes is in the social sciences. First, scaling a large amount of data into a single scale loses much of the nuance and explanatory power necessary to explain human action. Second, scaling together a large number of individual indicators makes the inclusion of inappropriate, erroneous, biased, or other problematic data into the index possible if not inevitable. If garbage is included the final result will also be corrupted. Again, this "garbage in, garbage out" method provides no real understanding of the world or the relationships those creating the index wanted to explore. Measurements from an index that includes bad data cannot be trusted to actually measure what it claims to be measuring. Undertaking to develop indexes that avoid this problem is challenging at best, and perhaps a fool's errand at worst.

While these criticisms are common across social science they have been particularly vocal in the area of quality of life, and have been leveled correctly against the popular indexes including: Sperling's Best Places index, *The Economist's* Magazines measure (2005), and the now common scales that attempt to rank individual geographies. How then, do we and the larger academic community that are engaged in working with these sorts of indexes, respond to these criticisms?

With regards to the first criticism it is certainly correct that aggregating, condensing, and scaling data loses nuance and some information. In fact, all quantitative research explicitly does this. It works with simplified models of the world, yes, but seeks out the commonalities between cases to explain human action and to tease out relationships. The bigger question is whether this approach explains human action is a meaningful way. When done correctly using data in this way can explain human action and provide valuable insights into politics and public policy issues (Blalock, 1985). The world is complex and difficult and it is important to simplify it so we can comprehend its complexities, but to simplify it too much is to make it unrecognizable.

We take the second criticism of "garbage in, garbage out" more seriously. It is vital that modelers and those creating indexes acknowledge that poorly built scales that do not have a strong theoretical basis for the inclusion of particular information, or that use suspect data will indeed lead to a biased index with limited (or no) explanatory power.

We take many precautions to limit the danger of including data that could bias the results. First, we firmly root the inclusion of any piece of data in the larger theory and literature about quality of life. Second, we are cognizant of the potential for our own error, and therefore use only commonly available data that is easily attainable and verifiable in constructing our index of quality of life.

Why Use an Index?

Despite these potential pitfalls, using an index to measure quality of life provides a number of advantages when undertaking to measure quality of life on a scale larger than a single individual. A properly constructed index has three key properties that are of particular value to this task. First, they are reliable, because they scale data together for various observations using a set of rules. Those rules mean that using identical data gets identical scores. Second, because indexes are reliable they are also comparable. The end results for one observation can be directly compared to the end results for another observation. In this case we can compare the final quality of life scores or the indicator scores against the other counties. Third, this comparability from their construction with a defined set of rules means that indexes are also severable—meaning that any part of the index is also comparable across observations. Those who employ our data and methods after us could examine the relationships between individual indicators and policy actions, for example, without overextending the power of our index. Finally, and most importantly to the scientific method, good indexes are replicable because they clearly define the data they include. Knowing how that data is scaled together allows future researchers to replicate the study using identical data or new data using the same scaling rules.

We further believe that indexes should have two additional properties that are not true by definition. Indexes should be open and they should be parsimonious. The root of good science is data availability, and that data, which is proprietary or released only with conditions, should raise serious questions about the veracity of the results. The data are likely to be useful and perhaps illuminating, but our position is that this limitation on availability matters.

We also value parsimony in an index, meaning we avoid including unnecessary variables or data "just because". Scaling together large numbers of independent variables is a sure recipe for corrupting an index or making it correlated with so many other factors as to render it useless in future work. Thus, we believe that the question that must be answered when determining whether to include any particular piece of data in an index, is, "What does this data add to the index that is not already there?" If the answer is that the other variables included in the index are good, but they cannot account for an important factor, the data should be included. If the answer is anything less, then the data is superfluous and will add nothing but random noise at best and bias at the worst. We constructed our index of quality of life using this robust and demanding approach.

Primarily we were concerned with creating a reliable index. To do so we needed a strong set of clear and justifiable rules that allow scaling the data and indicators into a final score. A number of systems of rules are available when constructing an index all of which meet the requirement of reliability. Two types of systems were of particular interest to us. The first, which we chose not to use, incorporated a weighting scheme for variables and indicators to allow for differential effects into the scaling rules. The second system, which we did use, does not weight the included variables or indicators, leaving each variable or indicator to affect the index in equal ways.

We reject the opportunity to weight variables because it is not clear how such weights can be applied across each county in the United States. Clearly preferences differ and as such one county may have residents who are willing to sacrifice much more of one indicator, say economic development, for more of another, say safety, than other counties. It is not at all clear, however, that weighting certain variables would solve this problem. Inevitably there is important data lost by weighting certain factors some individuals may count as important in their well-being. The weights are likely to be largely arbitrary and uninformative.

If future researchers have compelling evidence or arguments towards weighting different measures, our open data rule means our analysis can be replicated and ultimately adapted to weight indicators according to their theory. We believe that limits in the underlying theory of quality of life will make this unproductive, a position that is informed from the results of our analysis of indexes. Examining existing indexes, quality of life definitions, and the work of other scholars, clearly showed areas that were important to quality of life and should be included in this index. Our findings here did not provide any indication of the relative importance of any particular variable. Though, as we noted in our discussion of wealth in the previous chapter, this may merely indicate the need for further research and developments in the theory of quality of life rather than truly binding limitations on the field.

A final reason we prefer to treat each variable equally is it is the approach employed by many of the best indexes. The United Nations Human Development Index (2007), the Economic Freedom of the World Index, (Gwartney et al. 2016), and a number of other indexes, do not include weights. We believe this puts us in good company and replicates the best practices in the field.

The Data

Building from our preference for open data availability we use only publically available data, from four sources. The primary sources used include the United States Census for all US counties, the National Center for Educational Statistics, the American Community Survey (another survey carried out by the Census Bureau), and the US Geological Survey. We use data from 2000 to 2005 to create the quality of life scores for 2005. For the 2010 scores we use data primarily from 2009 to 2012. This data is commonly available free of charge from the United States Census, the NCES website, and the US Geological Survey. To aid replication and verification of this index we include identifiers and definitions of the data we used in the appendix. The appendix also includes contact information on how to receive the data for those interested.

Building the Index: The Rules

Because the end use of this index is not simply to enable a rank ordering of counties, we selected rules that would provide a unique score for each county, and could be used in future statistical projects. It is our strong belief that indexes should enable comparability

and so we designed this index primarily to maximize variation. Because we are interested in the full universe of United States counties the primary interest was in comparability within that group. As such, it is not necessarily true that comparing a county to a non-county entity would be valid. Such extensions of our index to new subjects and units of analysis should be done cautiously, yet they should be investigated.

We followed a three-step procedure to scale data into this index, for each variable we converted the actual value to a scale from 0 to 1. To accomplish this scaling, we used the well-tested and verified metric of the United Nations Human Development Index (2007). This method uses the maximum observed value, the minimum observed value, and the actual observed value for each observation to scale the data. The basic formula is (Observed Value - Minimum value) / Maximum Value - Minimum Value.

A scaled value represents where each county's value for a particular variable falls within the full universe of US counties. Fundamentally, this means we can take one county's score and immediately compare it to another county's score. We wanted an index where the scores are comparable without additional mathematical steps. We know that a value of 1 is the maximum value, and a value of 0 is the minimum value, and between those values lies most of the observations. Converting each variable to this scale means it is not gauging the results of a particular variable and instead scoring counties according to the maximum and minimum values we observed for that variable. Aggregating, our next operation, is possible because of this scaling process.

By scaling the variables to be rankings we can now aggregate the values of sub-indicators for each variable using averages and aggregate overall county scores in the same way. The formula utilizes the scaled value of each individual variable summed, and divided by X, the total number of variables included in the sub-indicator, to arrive at a simple average (Yonk, Smith, & Wardle, 2017). Again, we aggregate these simple averages and rescale to achieve a final score that ranges from 0 to 1. Using the basic formula (Observed Value-Minimum Value) / Maximum Value-Minimum Value, we use the scaled value of the sub-indicator average along with the other sub-indicators to repeat our scaling procedure. This provides the value of each of indicators for every observation.

Using this calculated value, we then calculate the final quality of life score. Again, we aggregated the indicators, and rescaled to achieve a final quality of life score that ranges from 0 to 1, using the formula (Observed Value-Minimum Value) / Maximum Value-Minimum Value. This final scaled result is the quality of life score for each county.

This methodology is remarkably simple and allows disparate data to be combined into a common scale, but, more importantly, it meets the requirements we laid out earlier for a good scale. Our first concern was that of reliability. By applying the formulas consistently, the achieved results that are given in the same data are identical; therefore, this measure is reliable. Our second criterion for a good scale is comparability, using this set of rules for scaling the reader can directly compare each of the counties using an identical metric—the results are comparable. The third criterion is that they must be severable, and because we scale each individual piece of data before aggregating the values one can compare counties using any subpart of the scale. The fourth criterion is repeatability, because we use commonly available census data that is measured four times each decade, and provide a clear delineation

of how we scaled that data together this scale is readily repeatable. We would also add two additional criteria that we feel are essential to a good scale, openness and parsimony. All of the data are commonly available through non-proprietary sources, and use a relatively small number of variables to create the scale; each of these criteria met what the established requirements need for a good index.

While we were establishing the rules to follow while scaling, we also undertook the job of ensuring that the data did not have to include unnecessary math, which we did for a variety of reasons. Primarily because anytime an author adds statistical sophistication to a project, like an index, you can easily add statistical error, and increase the chances of human error in altering the index. Our standard approach was to the use the simplest methodology that could still accomplish the full task. It is our belief in regard to index building that this approach is particularly important given the criticisms discussed earlier.

The Indicators

Our index has five indicators: public safety, health, economic development, infrastructure, and education. Using the established methodology, we calculated scores for each of these indicators and finally an overall quality of life score. Because the literature and our understanding of these areas differ, each indicator has variable component pieces, from a single sub-indicator in the public safety measure, to over a dozen variables in economic development. In each case we used literature on quality of life, as well as the tests performed and discussed in this chapter, to determine what those component pieces should be. For example, the original conception of public safety included a large number of variables that measured different areas of crime, but after further review of the literature and the testing for scalability with the other indicators, we found that those measures did not add information about quality of life. Instead, we found that the funding effort for each of the counties was better related to quality of life than outcome measures of crime.

To fully illustrate the construction of the scale we detail the process for each indicator in the appendix. As part of that process we have included the order of operations that were followed, and provided step-by-step instructions for those operations. Throughout our tracing of this process we often refer back to a specific operation, and identify that operation's sequential number within the indicator. This level of specificity in this calculation methodology may seem excessive, but it is our experience that more explanation is always better to aid in replication and even the most detailed instructions have ambiguities. Further, since the index we suggest is new it seems more prudent to include extra instruction. It is of paramount importance that this process be clear and undisguised. We hope that this level of detail, and as further explained in the appendix, will allow others to easily add or delete variables or even adapt this index for use with other levels of analysis or other geographic areas. Again, it is unlikely non-technical readers will need to read through the instructions for developing the scores in order to understand their applications in later chapters.

Education

Our Education indicator is composed of three sub-indicators: Funding Effort, Outcomes, and Service Availability. Taken together these indicators provide an understanding of education across counties.

The first sub-indicator in education is Funding Effort. A quality of life score which we will refer to as a Q score is the scaled results of our scaling procedure for each sub-indicator, and indicator which will are then aggregated into the final quality of life scaled scores using the procedures we described earlier in this chapter.

For our first sub-indicator in Education our primary interest is in the percent of the local budget devoted to education services, per capita educational payroll, and the per pupil spending. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Funding Effort.

The second sub-indicator in education are educational outcomes. Again, a Q Score designates the scaled results. The primary interest is in the percentage of high school completers from 16 to 19, college enrollment, percent of total population with a high school diploma, percent of the total population with a college diploma, and the percentage of the population completing less than ninth grade. We then aggregated the scaled results for each of these areas and scaled the average to obtain a score for Educational Outcomes.

The final sub-indicator in education is Service Availability. The primary interest is in the number of educational establishments per capita, and the availability of charter and magnet schools. We measure charter and magnet schools dichotomously with a value of 1 for counties with a charter or magnet school. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Service Availability.

Using each of the sub-indicators for Education; Funding Effort, Educational Outcomes, and Service Availability, we averaged the scores for each county, and scaled the average to calculate the final Education score.

Public Safety

The Public Safety indicator is composed of only Funding Effort, a single sub-indicator. This indicator provides an understanding of how public safety is provisioned across counties and captures the relationship between the individual citizen and the purchase of public safety services.

The only sub-indicator in Public Safety is Funding Effort; its Q Score designates the scaled results. The primary interest is in the expenditure per capita for both police and fire. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Funding Effort.

Health

Our Health indicator is composed of three sub-indicators: Funding Effort, Rates of Health Insurance Coverage, and Service Availability. Taken together these indicators provide an understanding of education across counties.

The first sub-indicator in education is Service Availability; The primary interest is in the number of physicians per 1000 residents, and employment of non-physicians in health care. We have aggregated the scaled results for each of these areas and scaled the average to obtain a score for Service Availability.

The second sub-indicator in health is funding effort on health-related activities; the primary interest is in hospital spending per capita and payroll of health care workers, which capture both private and public spending on health in each county. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for health funding effort.

The final sub-indicator in health is the rate of insurance coverage for each county. We calculated this rate using the reported number of persons without coverage, as a percentage of the overall population. We then scaled these results to achieve a score for insurance coverage.

Using each of these sub-indicators for health, funding effort, insurance rate, and service availability, we averaged the scores for each county, and scaled the average to calculate the final health score.

Economic Development

Our Economic Development indicator is composed of three sub-indicators: Funding Effort, Outcomes, and Service Availability. Taken together these indicators provide an understanding of economic development across counties.

The first sub-indicator in education is Service Availability. Our primary focus is in the availability of employment and business opportunities. The variables of interest include: total business establishments, travel time to work, location of place of work, and the change in total business establishments from the previous year (measuring new business growth). We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Service Availability.

The second sub-indicator in Economic Development is Economic Outcomes. The primary interest is in per capita income, the unemployment rate, and the economic diversity of the county. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Economic Outcomes.

The final sub-indicator in Economic Development is Funding Efforts towards economic development as measured by capital availability in each county. Using total bank deposits, total annual payroll, and total expenditures in manufacturing, we scaled these results to achieve a score for Funding Effort.

Using each of these sub-indicators for Economic Development: Funding Effort, Service Availability, and Economic Outcomes we averaged the scores for each county, and scaled the average to calculate the final Economic Development score.

Infrastructure

The indicator for Infrastructure is composed of two sub-indicators: Service Availability, and Funding Effort. Taken together these indicators provide an understanding of infrastructure development across counties.

The first sub-indicator in education is Service Availability. The primary interest is in the percentage of households that have access to various types of utility services. The variables of interest include: population served by public water, households with grid fuel available for use, and telephone availability penetration. These measures capture both publically and privately provided infrastructure. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Service Availability.

The second sub-indicator in Infrastructure is Funding Effort. The primary interest is in governmental revenues (a measure of funds available for use in infrastructure), direct expenditures on highways, and long-term debt for utilities of each county. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for Economic Outcomes.

Using both of the sub-indicators for Funding Effort and Service Availability we averaged the scores for each county and scaled the average to calculate the final infrastructure score.

Final Quality of Life Score

To calculate the final quality of life score we aggregated the scores for each of the indicators by averaging their scaled values, and scaled that average to obtain a final quality of life score that ranges from 0 to 1. This final score allows each county to be readily compared with any other county. The final score simply represents where the county falls in relation to the maximum and minimum observed values. The county with the lowest averaged score across the indicator receives a final score of 0, while the county with the highest average score receives a score of 1. The scores for both 2005 and 2010 are available from the authors.

Interpreting the Quality of Life Scores

The method for calculating quality of life is an explicitly comparative one because we scale all of the data instead of measuring the absolute level of quality of life. Our ultimate goal is to measure the relative level of quality of life within US counties. This is a core difference between this method and those utilized in popular media. We believe it is nigh on impossible to define what an absolute high quality of life is, what an appropriate level ought to be, or if an area is deprived. Considering this view, our measure allows the reader to identify where each county ranks in relation to the others.

At first glance this might not seem an important distinction, but in order to correctly utilize these measures in future projects, we must acknowledge what is, in fact, being measured. This acknowledgment returns the reader to the earlier discussion of what quality of life actually is, and how it should be measured. The final score measures the relative position of counties, in relation to each other, as a proxy for actual quality of life.

Our relative approach is a particularly important one, primarily because on the common measures of human well-being the United States and most of its counties score similarly. Our interest in quality of life is primarily in how it affects human actions, decisions, and overall outcomes for human beings. Without a strong variation across cases the explanatory power captured by any index can be nearly nonexistent. This approach, however, allows the variation between counties to be maximized, and provides the statistical power necessary to better explain how differences in an area's quality of life affect those who live there.

Statistically Validating our Index

Any index, including this one, must be viewed skeptically. At the heart of the scientific method and index building is the need for validation. Indexes can be plagued with measurement problems that center on whether they are actually measuring what they purport to be measuring. The prelude to testing whether an index is measuring what it claims to measure is to validate its methodologies. This method for calculating quality of life, as detailed in this chapter, can be readily replicated, altered, or used in pieces. The ultimate goal at the outset of this project was always to create a reliable and valid index. Any researcher can replicate these scores, use this methodology to include new information, weigh existing information in different ways, or challenge that methodology directly.

The procedure we follow for computing county quality of life scores yields an index that is both reliable and repeatable. If the data is to ever effectively explain real world events and conditions, then it must be reliable and repeatable so others may replicate and justify their use of the index. Our methodology has been confirmed and similar versions used across various indexes and our process is as clearly presented as possible. Replication and methodological rigor are, however only two processes for validation. The most meticulously built index is still useless if bears no relationship to what it sets out to measure. Indices that fail in this regard are doubly problematic because they give an air of accuracy their building blocks cannot maintain. Because their construction methodology is sound, they are often accepted at face value and readers assume the results can be used in the way the authors claim. Unfortunately, this is not necessarily the case and all indexes should be rigorously vetted.

We use a three-prong approach in validating our index extending previous work on indexes (Yonk et al., 2017). The first two we have already discussed, but the third is new and important. First, any index that claims to measure a social phenomenon

must have strong theoretical explanation to back up why the data included in the index is in fact a component of or a proxy for what is being measured. Second, the data included in the index should scale together. Finally, independent tests of the theoretical links should verify the construction of the index. To show their indexes indeed measure what they claim, scholars statistically validate the components of their measurement system in addition to the theoretical and scaling justifications.

Our approach to statistical justification uses two well know approaches; confirmatory factor analysis and principal component analysis, before also validating the index using individual-level survey data. Applying these statistical tests provides evidence as to whether the data scales and works together as expected. In both cases the statistical test is looking for relationships with an underlying concept or pattern and for our index to be valid we should expect to see consistent evidence that each of our indicators are related to some underlying concept in a way that is directionally consistent, in the case of our index we would expect that our indicators would be positively related to underlying concept of quality of life.

We conducted one additional validation in the form of an experiment to test whether individuals construct their own perceived quality of life in a similar way as our index predicts they should. In what follows we discuss how each of these tests validates this index.

Factor Analysis and Principal Component Analysis

Since the selection of data in the index was strongly rooted in theory, we chose to use confirmatory factor analysis, and principal component analysis to verify that the included data did in fact scale together to effect quality of life. We use each of the two waves of our index, 2005 and 2010, and conduct independent tests on each of the rounds of our index in our attempt to verify that the data does, in fact, represent common factors of an underlying concept.

Confirmatory factor analysis is an analysis which attempts to identify whether a series of variables, in this case these indicators, are common factors of some other unobserved phenomenon. Because we believe that these indicators should each have a positive effect on quality of life, using this approach is ideal. If the included data were in fact measuring quality of life, the reader would expect that each of the indicators would be a common factor.

This approach provides a statistical verification of the theory used to include data. Table 4.1 includes the results of the factor analysis for the five indicators from our 2005 index—education, public safety, infrastructure, health, and economic development. Because we have laid out clear expectations the reader can interpret the results much as we would those of a hypothesis test. In this case to confirm the hypothesis—that this index is measuring quality of life—each of the indicators should return a positive value. Further because we have not weighted the index, those values should be of a similar size.

Table 4.1 reports the results of the factor analysis for the 2005 index, in this case two factors are retained, and clearly factor one provides strong evidence that the

Table 4.1 Confirmatory factor analysis 2005

Variable	Factor 1	Factor 2	Uniqueness
Education	.5251	−.1721	.6946
Public safety	.4112	.0480	.8286
Infrastructure	.5889	.5889	.6485
Health	.3350	.2150	.8415
Economic development	.6208	−.0668	.6102

indicators are in fact measuring a common phenomenon, which we call quality of life. Each of the indicators in factor one are positive with a range from 0.33 to 0.62 indicating that each of the indicators is a common factor of the same underlying phenomenon. Further, each of our indicators has a high value for uniqueness, indicating that they are not simply reflections of the same phenomenon.

Table 4.2 reports the results of the factor analysis for the 2010 index, in this case three factors are retained, and clearly factor one provides some evidence that the indicators are in fact measuring a common phenomenon, which we call quality of life. Each of these indicators, in factor one, are positive with a range from a low of 0.0861 to 0.35 indicating that each of the indicators is a common factor of the same underlying phenomenon. The results of the value on the Economic Development Indicator for 2010 may well represent the impact of the great recession on the overall indicators but its direction and uniqueness leave us comfortable that we are, in fact, measuring a common phenomenon. Further, each of the other indicators has a high value for uniqueness, indicating that they are not simply reflections of the same phenomenon.

To further validate the index we use a second, similar statistical methodology that also seeks to identify relationship between the indicators and an underlying phenomenon. This approach is Principal Component Analysis (PCA), which seeks to identify whether particular data are component pieces of the same phenomenon. The reader can interpret the PCA results as a hypothesis test, with positive values of similar size indicating that the indicators are measuring a common phenomenon. These results are in Table 4.3 and 4.4 for each of the years of the index.

Our primary interest lies in Comp1, which has the largest explanatory power at .4486; this value indicates that component one is the best explained of the five components. We should expect that a single component would emerge just as component one did, and to validate the hypothesis the reader should see positive values for each of the indicators. As expected each of the indicators for comp1 are indeed positive and range from 0.3247 to 0.5215. Just as with the confirmatory factor analysis, PCA confirms that the indicators are components of an underlying phenomenon.

Our primary interest again lies in Comp1, which has the largest explanatory power at 0.2681; this value indicates that component one is the best explained of the five. We should expect that a single component would emerge just as component one did, and to validate the hypothesis the reader should see positive values for each of the indicators. As expected each of the indicators for comp1 are indeed positive and range from 0.1542 to 0.5669. Again, our results are consistent with the confirmatory factor analysis. In both years of our index we find evidence that the indicators we

Table 4.2 Confirmatory factor analysis 2010

Variable	Factor 1	Factor 2	Factor 3	Uniqueness
Education	.3376	.0807	−.1046	.8686
Public safety	.1174	.0689	.1617	.9376
Infrastructure	.3538	−.0016	.0795	.8685
Health	.3412	−.1870	−0522	.8459
Economic development	.0861	.2889	−.0427	.9073

Table 4.3 Principal component analysis 2005

	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5
Eigen value	2.075	.944	.807	.6275	.5456
Proportion	.4151	.1888	.1615	.1255	.1091
Variable					
Education	.4587	−.5228	−.1173	.4943	5081
Public safety	.3918	.0724	.9113	.0214	−.0922
Infrastructure	.5087	.0958	−.1622	−.7653	.3465
Health	.3247	.8202	−.2075	.4097	.1044
Economic development	.5215	−.1987	−.2940	.0331	−.7753

Table 4.4 Principal component analysis 2010

	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5
Eigen value	1.3405	1.0886	1.0144	.8405	.7160
Proportion	.2681	.2177	.2029	.1681	.1432
Variable					
Education	.5350	.1881	−.4570	.4885	−.4804
Public safety	.3132	.1848	.7792	.4816	.1696
Infrastructure	.5669	−.0333	.2823	−.6890	−.3509
Health	.5201	−.5109	−.2439	.0273	.6390
Economic development	.1542	.8175	−.2119	−.2323	.4572

have chosen are measuring an underlying concept, a concept we believe is best called quality of life.

It is more important that the indicators are common predictors of the phenomenon than what one chooses to call that phenomenon. The beauty of confirmatory factor analysis and principal component analysis, is that they find patterns in the data, and relate those patterns to outcomes. This approach, which is theory blind, provides an unbiased picture of whether the data included in the index scales together.

Given the results from both of the statistical tests employed across both years of the index, it is clear that the indicators are measuring a common phenomenon. When this is coupled with expectations raised by the theory relied upon, it becomes apparent that the underlying phenomenon is in fact quality of life.

This validation is an important improvement over previous indexes that used only theory to justify their inclusion of particular data, and fail to test whether that theory is correct. These results indicate that not only do the indicators have strong roots in theory, but those same results indicate that the theory is correct. If the theory was simply wrong the data would not scale together as seen here.

Survey Validation: Subjective Quality of Life and Our Index

Our next validation method involved surveying undergraduate students from a wide range of majors and from various years of schooling (freshman—senior), and was monitored by the Institutional Review Board at Utah State University. The goal of this survey as administered was to determine the students' subjective evaluation of their quality of life and to compare and validate our conception of quality of life as being related to our indicators in the way the student respondents viewed their own life quality.

The survey consisted of five parts. The first part analyzed the demographics of the students being surveyed, his or her university major and other university information, as well as political orientation. The second part asked students to rank their personal situation with regards to each of the indicators. The third part related to a recent experience of a student initiated fee proposal and is our distraction activity. It asked if the student would be willing to support raising student fees in order to receive more university services. The fourth part examined the student's general knowledge of the school, reflecting the student's knowledge of the political system within the school when given the self-tax option. Finally, the fifth part of the survey includes a quality of life scale.

The students were asked to rank the quality of his or her entire experience at Utah State University using a scale of 0 to 10, 0 being very low quality and 10 being very high quality. The surveyors instructed the students being surveyed that they must completely finish each part of the survey before they could continue on to the next part. This was to ensure that the survey questions that followed would be unaffected by the answers from previous sections.

The students were from five different classes. Many of these classes could be chosen as general education credits, so the classes consisted of students from a wide variety of majors and emphases. The classes surveyed included one Introduction to Economic Institutions class, one General Social Systems and Issues class, two Introductions to Microeconomics classes, and one Introduction to Public Policy class. A pretest was conducted outside of these classes before the official surveying in order to discover and correct any poor questions or other errors in the survey before officially testing students.

Once the surveys had been administered, we developed a consistent system of coding to organize the survey. For Part I, we coded the letter indicated on each multiple-choice answer. On a few questions, the student could fill in an answer, if not provided, in the space next to the "Other" option. In this case, we had created a

column and typed in that student's answer; the same was done when the student wrote in his or her major. On Part II, the answers were coded on a scale from 0 to 10 with 0 being very low quality and 10 being very high quality. Part III was simple in that we coded whether the student's answer was either "A. Support" or "B. Oppose." In Part IV, we used a dichotomous coding approach. If the student wrote down the correct answer in the blank, we entered a 1, and if the answer was incorrect, we entered a 0. Similar to Part II, we used a scale of 0 to 10 to code the student's decision of his/her overall quality of life in Part V.

To test if the survey results validate the index and further confirm the theory that underlies it, we tested whether rankings on the individual indicators were predictors of respondents overall ranking of quality of life. If the phenomenon identified in this factor and PCA analyses is in fact quality of life individual responses about their perceptions of each of the sub indicators should have a statistically significant effect on their evaluation of quality of life. Therefore, this approach allows us to simultaneously find evidence both the larger theory and the index simultaneously.

Survey Results

The results from the experimental survey are found in Table 4.5.

Because interest lies in both whether the indicators are actual predictors of quality of life and the magnitude of the effect of those indicators we conducted two Ordered Logit regressions, one with only the control variables and one with the indicators included. As seen in Table 4.5 each of these indicators has a positive and significant effect on quality of life. While these results indicate that the effect is real, we were also concerned about whether including the indicators would improve the model substantively. To address this question, we compared the Pseudo R Squares, both when the indicators were included, and when they were not. The controls only model had a Pseudo R Square of 0.0440, while including these indicators increased that value to 0.2254, indicating that those indicators provided much greater explanatory power than just the controls.

Given these results it is apparent that the construction of the index matches with some degree of accuracy how individuals consider quality of life. Furthermore,

Table 4.5 Survey results-ordered logit

N = 258 Pseudo R Square: .2254			
	Coef	Standard error	P Score
Personal safety	.3429	.1785	.05*
Infrastructure	.2753	.1080	.01**
Economic	.1503	.0739	.04*
Health	.3505	.1208	.00**
Education	.7941	.1246	.00**

Control Variables excluded from table
*p<.05
**p<.01

these results indicate that without measures of the key areas, individual level attributes have a much more diminished explanatory power.

Using both statistical techniques that work with the data included in the index, and conducting a survey that asks individuals about their personal quality of life provides a unique dual validation of the index. The first technique confirms that the selected data do in fact share a common correlate, what we term quality of life. The second confirms this index by using responses from actual human beings about their perceived quality of life.

The results of both sets of tests confirm that the index is a valid measure of quality of life. This is primarily because given the results of the dual tests the index has the following properties. First it is measuring a phenomenon. Second the tests confirm that the each of the indicators predict that phenomenon. Third, that given the theory that phenomenon is quality of life. Fourth our theory, and by extension the index, are confirmed by the survey results. Given these four criteria we can confidently conclude that the index is validated through statistical and survey techniques.

Having constructed and validated our measure of well-being we now turn to a full examination and exploration of the relationships between quality of life, politics, and public policy. In the remaining chapters, we detail a variety of topics using our index and show the implications quality of life has in the social and political arenas.

Chapter 5
Quality of Life in Theory and Practice

Voters approached the polls on November 5, 2016, with the hopes of improving their quality of life just as they had done every election prior. The common election question, "Are you better off than you were four years ago?" explicitly primes voters with just this thinking as well. It is clear that many voters think and view voting as a potential avenue to improve their lives. We, however, think the underlying logic they are applying to the question of who they vote for is likely much more complicated than a simple calculation of costs and benefits. In the course of this book we cover several empirical examples that demonstrate distinct modes of thought about how quality of life interacts with an individual's decision-making.

Quality of life is obviously an important factor with significant effect on an individual's actions. Examples are simple and intuitive. Someone who would never otherwise steal, may walk out of a store with something extra in their bag if they are starving. Rich and happy individuals may vote against changes to laws and regulations in order to protect their existing life quality while the less fortunate may seek to improve their well-being through voting. These examples make intuitive sense. We are not alone in this position. Calvert and Henderson (2000), Lietske (1990), and a plethora of previous scholars have powerfully demonstrated the importance of quality of life measures in both individual actions and broader social trends.

What is obscure and missing from the existing research on quality of life is an understanding of why an aggregate measure of life quality, such as the Calvert and Henderson Index, or even our index, would affect individual level decisions either generally or at the aggregated macro level. Despite this missing link, it is apparent that aggregate measures are often predictors of aggregated individual decision making. Nowhere is this clearer than the often replicated and supremely reliable relationship between income and voter turnout.

We propose three theoretical explanations for how aggregate measures of quality of life could affect individual decision-making. Then we illustrate how they might affect the decision to vote by applying each approach to the case of voter turnout. Unlike usual hypotheses where generally only a single option can be true, we believe the relationship between well-being and an individual's choices is more

R.M. Yonk, J.T. Smith, *Politics and Quality of Life*, SpringerBriefs in Political Science, https://doi.org/10.1007/978-3-319-72571-0_5

Table 5.1 Naive bivariate regression of voter turnout on our index's quality of life scores

Voter Turnout—Bivariate			
Observations 3140			
Adjusted r^2 0.1492			
Variable	**Coef**	**Robust standard error**	**P Value**
Quality of life score	7216.73	3073.31	0.000**
Constant	−1771.56	93.73	0.000**

*p<.1
**p<.05
***p<.01

complicated and depends on several factors. It is likely that each of our three theories applies in different types of cases.

Our first theory is the resource explanation. Quality of life may simply be a resource that can be used in the decision-making process like any other resource. Actors may view well-being as something akin to their income, investments or time. A second potential explanation is found in rationalism's maximizing theory. In this theory quality of life may simply be a value individuals' attempt to maximize as part of their overall utility function. They will avoid things that decrease it and flock to those that do. Our final theory, the political psychology model or behavioral economics model, posits that rather than being a resource or a desired end, life quality is an intervening variable with direct impact in the decision processes individuals engage in politically. This approach is similar to the conception of Zaller (1992) or Lodge, Steenbergen, and Brau (1995), that is quality of life is intervening and being used by the individual as they engage in political decision making, and as a result the manner and outcome of the individual's decision making process is impacted.

In considering these possible theoretical explanations we examine a thoroughly studied political phenomenon, voter turnout, and conduct a simple regression analysis using the 2005 quality of life scores and data. While controlling for other possible explanations, this analysis tests the hypothesis that high quality of life is positively related to higher voter turnout. We use these results to explore how the three theories presented could explain the mechanism by which quality of life relates to political outcomes particularly voter turnout.

To begin we conducted a standard bivariate OLS regression using the 2004 presidential election. The results of the regression are founding in Table 5.1.

This simplistic and trivial bivariate regression suggests that an increase of one point in the quality of life score yields approximately 7200 additional voters. The literature, however, provides a number of other variables that should be significant predictors of voter turnout. To control for the most common explanations, we include minority percentage, metro area, per capita income, crime rate, unemployment rate, percent female, and total population. The results of the multivariate regression are found in Table 5.2.

The multivariate regression confirms the bivariate result even when controlling for a variety of other probable causes. This is statistical evidence, but without the guiding theory behind it, it only reveals correlation. Given this constraint on the

Table 5.2 Multivariate regression of voter turnout and quality of life scores

Voter Turnout-OLS			
Observations 3140			
Adjusted R-Sqr 0.9550			
Variable	**Coef**	**Robust standard error**	**P Value**
Quality of life score	1098.96	78.88	.000***
Percent minority	−.5104	.0049	.000***
Metro area	930.092	927.96	.316
Per capita income	.0452	.0612	.460
Crime rate	−.1253	.077	.10*
Unemployment rate	130.20	236.68	.582
Percent female	547.88	175.81	.002***
Population	−.0409	.0038	.000***
Constant	−592.87	89.85	.000***

*p<.1
**p<.05
***p<.01

reach of the power of regression analysis, providing equally convincing theoretical explanations for why well-being, as measured by our life quality index, should have influence on voter turnout is vital.

Quality of Life as a Resource

Models of voting behavior suggest that voters pay costs of both pecuniary and non-pecuniary characteristics, such as social status, employment type, and social capital. This conception of resources provides an interesting theoretical possibility for how aggregate life quality might have a distinct effect on various societal outcomes. It is possible that voters draw on it in the same way as they do the other costs of voting.

Before explaining the effect of aggregate factors on voter turnout it is important to remember that those rates increase only when individual citizens decide to vote. Any aggregate explanation must be directly tied to the individual's decision to vote. A theory of collective action that does not follow from examining the institutions and incentives individuals in that collective face will fail to truly explain the resulting aggregate effects.

Nie et al. (1979), as well as Brady, Verba, and Schlozman (1995), develop resource models of voting, where the decision to act is contingent on the individual having the necessary resources available. Brady's paper shows that those with greater resources are more likely to vote and Nie et al. further suggests that time, political knowledge, and requests to participate are key resources that should be considered. Rosenstone and Hansen (1993), as well as Wolfinger and Rosenstone (1980) undertake a similar task, seeking to evaluate what prevents individuals from voting, instead of the specific resources that an individual has that facilitate voting. The sum of these arguments is that those with greater resources, as described by the

Brady et al. model, or citizens with particular characteristics, as described in both Wolfinger and Rosenstone (1980) and Rosenstone and Hansen (1993), make up the group of likely voters.

The resource model of voting has long suggested that as an individual's stock of resources increases, the probability of that individual voting, and thus the overall rate of voter turnout, likewise increases. This notion of resource based voting submits that as resources increase, individuals and, thereby, the aggregation of their preferences, can be used to achieve particular outcomes.

However, most of the voting resource literature employs only first order effects from the various characteristics or resources, and fails to recognize that second or third order effects might also be necessary, if not sufficient, to determine outcomes. This distinction is particularly important given what was a seemingly unlikely correlation between some of the resources suggested by Nie, Verba, and Petrocik (1979) and Rosenstone and Hansen (1993) in their discussion of voter turnout. Building from this resource focused approach to voter turnout, we conceive of quality of life as primarily a background variable, albeit one with theoretically demonstrated importance on a variety of societal outcomes. Primarily we believe it is one long neglected, but vital consideration, in analyzing social trends. The logic of this effort suggests that not only would available resources affect voter participation and turnout, but that other political variables, like well-being, that are predicated on the individual should similarly exhibit a relationship between some resource and the actions of the individuals.

Using the reasoning of resource explanations proposed in Nie et al. (1979) and Rosenstone and Hansen (1993) to explain the mechanism by which life quality might influence political outcomes provides clear predictions about the expected direction and nature of the relationships. For example, in exploring the relationship between voter turnout and well-being it seems apparent that higher quality of life should be associated with higher turnout rates. The resource theory suggests that as quality of life increases, we expect to see greater participation in electoral contests because the resource of life quality could be drawn upon to facilitate the decision to participate.

Similar approaches to our resource theory have usually been satisfied with considering only the direct and immediate effect of such variables, that effect is not the only possible explanation. Indeed, one of the chief critiques of this sort of approach is that it fails to recognize the likelihood of multiple and ordered causation. Quality of life is likely to be a first, second or third order predecessor of a variety of social outcomes, just as social class, income, or other aggregate measures are precursors.

This theoretical possibility can be best expressed as a function of the other variables of interest and quality of life in relationship to some dependent variable. If quality of life is a first order predecessor, the function is:

$Y_i = f(X_1, X_2, X_3, \ldots Q_i)$, where Q represents a measure of quality of life of an area. In this case, quality of life is an independent variable of interest and has an independent effect on the dependent variable, controlling for the other variables.

If relationship is passed through some other variable as a second order predecessor, the function would be expressed as:

$Y_i = f(X_1, X_2, X_3, \ldots Q_i)$ with

$X_i = f(X_1, X_2, X_3, \ldots Q_i)$, Q again representing a measure of quality of life in an area. As a second order predecessor, quality of life has no direct effect on the depen-

dent variable but instead affects another variable, x_i, which then exerts its effect as a predecessor to an independent variable of interest.

The logic of this approach can be extended, but it is unlikely that the reality of the world is as cleanly modelable as suggested by the ordered causation that would necessarily be implied with an ordered approach to the resource model. It is more likely the relationship is a mix of first order effects, second order, and even third order effects. The simplest expression of this possibility is expressed as a two-step function where life quality is a variable of interest in both functions as in:

$$Y_i = f\left(X_1, X_2, X_3, Q_i \ldots X_i\right) \text{with}$$

$$X_i = f\left(X_4, X_5, X_6, \ldots Q_i\right).$$

This method could be readily tested as its simplest implication is that, regardless of the order of the effect, quality of life should be a statistically significant predictor of the measured outcome. At least three potential complications arise from this seeming simplicity. First, in order to test this proposition directly, it is necessary to know what X_i is. Second, even if X_i is readily identifiable, standard statistical techniques are complicated by the nature of its predictions, which suggest an effect that might be direct or indirect. Finally, because the effect is likely to be mixed, teasing the causal relationships out is nearly impossible, even when holding the other variables constant. If any of the effect is from a secondary order relationship, the collinearity will bias the estimate of the coefficient and confuse the interpretation if well-being is a predecessor to any other variable other than X_i.

Despite these statistical problems, the predictions do not change, regardless of which of the plethora of approaches is used. Thus, it does not represent a large problem for the theory as presented here. The only attempt we made is to demonstrate the relevance of quality of life to political and social outcomes. Significant, further research is necessary to construct models that can deal with the problems represented by the ordered nature of the effects. Indeed, regardless of the statistical problems, the predictions of the theory are consistent and the direction of the bias, in the case that any exists, should work against those predictions making it more difficult to reject the null hypothesis of no effect.

Maximizing Utility Model—Rationalism

Most of the explanations of voter behavior have been focused in a utility maximization paradigm, and indeed the notion of maximizing might well explain how life quality influences political decisions and outcomes. Quality of life easily fits within the standard utility maximization model.

Voter participation in the United States has been widely studied by students of American politics and those interested in electoral behavior. A variety of explanations emerges from these studies. Quality of life is one aspect of these relationships that has been understudied.

At the most basic level the decision to vote is an individual one, and explanations for the overall low aggregate level of voter turnout must maintain explicitly individual causes. Most scholars who attempt to explain why voter turnout is relatively low in the US are the intellectual progeny of work done by Anthony Downs (1957). Writing in *An Economic Theory of Democracy*, Downs considers voting as a personal economic act, an act that has both costs and benefits. He asserts that only when the benefits of voting outweigh the costs of voting will any individual actually vote.

The cost-benefit perspective of utility maximization Downs (1957) suggests a formula that attempts to explain the decision to vote. Using this standard cost-benefit analysis, he asserts that not only must the benefits outweigh the costs but that probability of receiving those benefits must be included in any model of the decision to vote. This basic formula is that in order for an individual to vote their private benefits must be greater than zero after considering the costs. Formulaically it is usually presented as private benefits – costs >0 (or more concisely as PB – C > 0). This simple equation provides the foundation for many approaches to understanding both individual and aggregate decisions to vote.

The clear implication of the Downsian model is that the expected benefits would have to be of such a magnitude as to overcome the small probability of any one vote being determinate in the outcome of the election. Even in small communities with tiny electorates, it rapidly becomes clear that even miniscule costs should easily outweigh such diluted benefits. The predictions from the simple cost-benefit evaluation are voter turnout rates far below what is currently observed in US elections. Downs (1957) explains the discrepancy between the actual observed voting behavior and the model's predictions as being explained by less obvious benefits such as: civicness, patriotism, or a sense of duty.

Riker and Ordeshook's (1968) work considering decisions to vote expands Downsian civicness as the explanation for the discrepancy in individual decision to vote by including an additional term which is called "D", in the Downsian model of voter decision. This additional "D" term seeks to account for influences outside of direct costs or benefits of the actual act of voting that can alter the decision to vote things such as civic obligation or the social benefits of being recognized as having voted. This revised model, PB – C + D > 0, allows the Downsian model of decision to vote to generate predictions of voter turnout that are in line with observed voting behavior.

Using this model of individual decision to vote provides a systematic method for considering the proximate causes of voter turnout in the United States. This model has three moving parts and each of them can directly be tied to an effect on voter turnout: the benefits of voting to the voter, the costs of voting, and the illusive D term. Most convincing work on voter turnout can be directly tied to changes in one or more of these components.

While the beneficial inducements to vote are diluted substantially by the probability of being the determinant vote in the election, there are clear benefits to the individual. These benefits including: material gains from favorable policies, fulfilled preference for a particular candidate, and risk aversion to change, have all been discussed as benefits from voting. Both Brady, Verba, and Scholzman's (1995)

and, later, Jessee's (2009) piece on spatial voting discuss in some detail what the potential benefits of voting can be. Jessee, in particular, identifies that through voting citizens achieve ideological preferences and can connect those preferences to the outcomes of elections. This indicates that voters can, in fact, identify specific benefits they might receive under some circumstances, and it gives some credence to the inclusion of the particular benefits in the model of decision to vote.

Finding evidence of this sort verifies the theoretic justification of using the economic model of voting espoused by Downs (1957), his scholarly posterity, and most work on voter turnout. While theoretically important, most explanations of the decision to vote have little emphasis on the benefits of voting; those benefits are greatly diluted because the probability of an individual's single vote being the decider in any particular election approaches zero in any election, even elections among relatively small groups. Given this reality, it is possible that the lack of benefits to individual voters may in fact have some effect on the overall rate of voter turnout in US elections.

Like beneficial inducements, cost barriers to voting are explicitly individual in nature. The effect of costs is understandable only as they relate to individuals and not as they relate across geographic regions or population groups. A simple and beneficial heuristic for these cost barriers is to divide them into institutionally imposed costs and the personal costs of voting.

A large literature has developed that seeks to explain the institutionally imposed costs of voting. Those costs include: limited poll hours, registration requirements, poll location, ID requirements, and a myriad of other restrictions on voting that create roadblocks to the interaction between the citizen and the voting booth. Most scholars have found that these institutional costs have substantive effects on voter turnout, and they appear to affect individual voter turnout decisions in meaningful ways. Rosenstone and Hansen (1993) detail many of the institutional costs of voting and suggest that when taken together, they have the potential to alter electoral outcomes.

In particular, significant work has been done on the effect of voter registration requirements on voter turnout. Wolfinger and Rosenstone (1980) have focused substantially on this question and found replicated results that indicate registration requirements lower turnout. Likewise, Timpone (1998) finds similar effects and argues that registration requirements have a dampening effect on voter turnout across election locations, types, and years. Given the consistent results of scholarship in this area, many have suggested that easing voter registration requirements is a clear way to reduce the costs of voting.

A number of scholars have studied the effect of same day registration in the nine states that currently allow citizens to both register and vote on the same day. Brians and Grofman, in their 2001 study, find that allowing same day registration increases voter turnout in substantively measurable amounts. The work on the costs of voter registration rules indicates that the costs imposed institutionally are altering decisions to vote and have a real effect on overall voter turnout. Taken collectively, it is difficult to underestimate the potential effect institutional requirements might have on voter turnout in any given election.

Institutionally imposed costs are perhaps the most clearly observable costs of voting, but other costs have been identified and can have considerable effect on

turnout. Preparation costs, economic opportunity costs, identity costs, or any cost that is directly associated with the act of voting fall into this category. Wolfinger and Rosenstone (1980) lay out many of the costs of voting as do Piven and Cloward (1988), and Rosentstone and Hansen (1993).

The common thread across each of these discussions of voting is that regardless of where the costs originate, they are felt by individual voters. Moreover, they can be defined as costs in the Downsian equation because they can be directly tied to the actor of interest, the individual deciding to vote. Unlike the beneficial inducements to vote, which are conditional on being the determinant voter, the costs of voting are unconditioned and borne by the actor regardless of outside influences.

The costs of voting are clearly an important part of the decision to vote and seem to explain why no one would vote. On the flip side is the D term which indicates why, despite what can be relatively high costs to voting, individuals might still vote. Originally operationalized as civicness, the D term serves as a catch all for any influence outside the individual actor's specific costs or benefits that can influence the decision to vote. With the expansion of the meaning of the D term has come an area of study that seeks to evaluate how the environment in which an individual exists alters their propensity to vote.

These influences have been widely and disparately studied, and yet these outside influences have been recognized as key to individual decisions to vote. Wolfinger and Rosenstone (1980), as well as Rosenstone and Hansen (1993), discuss a number of these influences, including social pressures, expectations among peer groups, and others that fall close to the original conception articulated by Downs (1957) and later by Riker and Ordeshook (1968). Likewise, Gerber and Green (1999) have conducted numerous field studies that attempt to parcel out what outside influences might affect individual decisions to vote. Arceneaux and Nickerson provide a comprehensive review of those experiments in their 2009 piece that reconsiders much of the data from those earlier studies. In short, they find that the D term is of paramount importance.

A number of studies have provided additional evidence for non-direct influences to vote. For example, Tam Cho (1999) finds that among recent immigrants and new citizens, the D term is variable in construction, and that what induces one individual to vote may not induce another. In a radical extension of what the D term might include, Fowler et al. (2008) find a strong genetic influence on decisions to vote among twin pairs in California.

We find that what is common among these studies is the reliance on individuals to make the decision to vote. In short, even in the world of outside influences, the individual is the determining factor. This reveals that from both the construction of the Downsian model, and the associated scholarly work, that increasing voter turnout must be a function of either reducing the costs of voting, or increasing the value of the D term. Theoretically increasing the value of the private benefits from voting might also increase voter turnout, but given the small chance of affecting electoral outcomes, this approach appears unlikely.

The decision to maximize quality of life could be appropriately understood as potentially involving some desire to maximize quality of life. For example, Riker

and Ordeshook (1968) suggest civicness as a motivating factor because the direct benefits from voting are minimal. Their approach and the approach of those following him suggest that intrinsic motivation is the most likely candidate for inclusion in an individual's D term. We extend this thinking and suggest that the D term is also a function of well-being as a mechanism where expected utility from the larger societal concerns can be included in the cost benefit analysis of voting. This conception seems to square with how individuals view their involvement with voting process. It is commonly reported by individuals that they expect societal benefits even if they receive no personal ones from the act of voting.

Our position here also proposes that in politics, like in economic decision-making, preferences are multifaceted and multi-peaked. Indeed, it is possible to desire individualized benefits while also preferring actions that lead to societal benefits at the same time. Even when individual benefits are unlikely, if quality of life generally is part of a utility function, individuals will still act to maximize on that preference.

Considering the rational utility approach, on average we can predict that individuals will prefer more to less life quality and will take action to preserve and achieve that preference. Thus, an individual's utility functions include life quality among their other preferences. For example, it could be simplistically modeled as:

$$U_i = f\left(X_1,,X_2,,X_3 \ldots Q_i\right)$$

However, like all rational utility models, this model requires an assumption about what the individual's preferences are with regard to life quality, and no matter how well justified those assumptions are, they may be inaccurate considering the finite nature of resources and how individuals may make tradeoffs within those preferences. Such pretenses to understanding of individual thinking are dangerous and should be done carefully so that they are robust and can be accurately aggregated.

Psych Model

Neither the resource or utility models presented have anything to say about how an individual facing a variety of tradeoffs looks at those tradeoffs and thinks through their decision. Drawing on the insights of political psychology and behavioral economics, we theorize that there are important psychological effects of quality of life that could be at play in their decision. The psychological process of decision making is another avenue for well-being to play a part in an individual's decisions.

The roots of this approach can be traced directly to the earliest work in political behavior. It presumed that individual citizens were making decisions based on little or no information. Pairing ignorance with the common tendency to decide despite their ignorance, individuals generally choose suboptimal political outcomes, according to this theory. This early school of thought asserted that because voters

lack information, they are unable or unlikely to gain information, and therefore, answer questions about policy through a process little better than random guessing (Converse, 1964). Converse and others correctly identify a tendency of respondents to answer policy questions even when they lack information about the policy in question (Campbell, Converse, Miller, & Stokes, 1960). These authors laid the groundwork for a discussion of both why respondents answer in this uniform way and a larger discussion about how respondents come to answers without all the information. Other work in this area is summarized well in the behavioral economics literature, specifically in Nobel laureate Daniel Kahneman's book, *Thinking Fast and Slow* (2011).

A short review of the literature makes it apparent that something more than random guessing is occurring when individuals make decisions. Respondents are utilizing decision strategies that draw on the minimal information they have to answer questions when asked (Popkin, 1991). These heuristics are powerful shortcuts to answering difficult questions (Kahneman, 2011). That members of the public attempt to use information when considering public policy, leads directly to the mechanism by which quality of life might be used by individuals in decision making.

Two approaches are of special interest while considering how life quality affects political decision making: Zaller's (1992) receive-accept-sample model and Lodge, Steenbergen, and Brau's (1995) theory of mental sorting and tallying. Together, we think these appear to explain the use of quality of life as both a long-term determinant of action and a short-cut heuristic for decisions.

Zaller's (1992) Receive-Accept-Sample model of the cognitive use of political information suggests a three-stage process for using information: reception, acceptance (or rejection), and sampling accepted and stored information for use. In more depth, information must first be received. Importantly, the reception of information in this approach is more than mere exposure to information or the existence of information in the individual's environment. That the information is available is necessary, but not sufficient. Instead Zaller's requirement for reception is a cognitive process whereby individuals are active recipients of the information. For example, in reading, discussing or consuming the knowledge in another manner.

The second stage that must occur is for information to be accepted. Acceptance according to Zaller's theory is a cognitively active process where a decision must be made as to whether the information is likely to be of use in future decision making. If this is the case, the knowledge is accepted and made available for later decisions.

The final step provides the figurative muscle to the theory. After having received and accepted information through cognitive processes, information is now available for use in future decision-making scenarios. However, this information exists only in concert with other accepted information, and the decision process then becomes a matter of sampling the relevant information and cognitively engaging in some processes of evaluating and choosing between alternatives.

As is clear from his description, Zaller's conception of aggregating information for use in decision making is a cognitively intensive process where information is

processed, stored, and explicitly used in decision making. This approach would suggest that individuals are aware of the life quality of their geographic area, and have processed that information, and use it directly in the decision-making processes.

While this cognitively intense process is clearly desirable from a democratic perspective, it ignores the reality of how decisions are actually made. Indeed, Lodge, Steenbergen, and Brau (1995) suggest an alternative mechanism for understanding how voters utilize information to make electoral and political decisions. Rather than the information retention assumptions of traditional rationality models, or the information-less models suggested by Converse (1964), or even the models proposed by Zaller (1992), they suggest that the roots of electoral decision making can be found in the realities of cognitive psychology.

Lodge, Steenbergen, and Brau suggest that individuals utilize information in fairly effective ways at the moment of reception and classify that information in relation to how it effects their evaluations of candidates. Individuals then fail, for a variety of reasons, to retain that information for future specific recall. In short, Lodge et al.'s (1995) model of electoral decision making for the average citizen operates much like a tally sheet. New information is tallied in relation to a specific decision, idea, or individual, and while no specific information is retained, the net effect of each piece of information is expressed in the final mental or as they describe it "online" tally. Candidates, or policy options, receive a general ranking, but it lacks intensity or reference to any issue voters may think is more pertinent than others.

Unlike the strict cost-benefit assumptions of the rational model, the online tally model requires only short-term use of any particular piece of information and creates a potential shortcut to rationality that, if correct, seemingly provides a bridge between the rejection of rationality that has been the watchword of the bulk of the study of political behavior and rational behavior. While their proposal is certainly attractive, evaluating whether the evidence they provide is sufficient requires some understanding of the cognitive psychology they claim as a basis. Serious critical consideration of whether the online tally they use truly represents marginal rationality in decision making is also warranted. The literature provides background information that can be used to consider the foundations of the online tally. Essentially, they can be used to evaluate whether individuals actually use information in the way the online tally model suggests that they should.

One of the key claims that the online tally rests on is that human memory is likely to retain general ideas, but not specifics. For example, Daniel Schacter's (1999) piece, "The Seven Sins of Memory," is an ideal starting place to evaluate whether Lodge et al.'s (1995) conception of memory is correct. The bulk of the seven sins, or more precisely, errors in memory, are at first glance consistent with the conception of memory indicated by Lodge et al. Memory according to Schacter is likely to be transient, with access to specifics decreasing over time. Some of the errors in memory, however, seem to question the veracity of the online tally by suggesting that memories can include large amounts of inaccuracy, either through selective retention (a small problem) or through the actual creation of false memories (a big problem). If the online tally is affected by these same processes of memory, the rationality of any tally would be greatly disrupted. Fiske and Taylor (1991) identify

similar issues that, while anchoring the online tally in seemingly accurate conceptions of the transience of memory, also suggest the possibility of error in remembering the tally correctly.

Taking the assumptions of Lodge et al. with regard to memory as given, a second set of considerations emerge that are also important. If the online tally is in fact how information is used, what determines how the tally is made? One of the core assumptions of the online tally model is that decisions made when information is immediately available are more likely, in the rational sense, to be correct. However, Ferguson and Bargh (2004) identify situations where both decisions and action appear predetermined due to the social perceptions of the individual. They suggest that merely by introducing a concept—priming—the outcome of a decision or action can be greatly affected. For example, their research suggests that simply by priming intelligence or stupidity to subjects in an experimental setting can alter the outcome of a knowledge test in substantive ways. Likewise, Wheeler and Petty (2001) provide similar evidence that the activation of stereotypes alone can have similar effects to priming.

Wheeler and Petty's stereotype activation envisions both stereotypes that include the individual (self-stereotypes), and those that do not. They suggest that self-stereotype activation is likely to occur using a threat model, which could be a rational decision process where consideration occurs yielding an alternate outcome. Their work, however, indicates that these effects can occur even when the activated stereotype is not a self-stereotype, but is rather what they term an "ideomotor". This suggests that the immediate rationality envisioned by Lodge et al. (1995), may not be robust. Instead Wheeler and Petty find that the mere suggestion of a stereotype can alter both behavior and decision making, even when the individual is not part of the stereotyped group. Their findings call into serious question the idea that even the immediate classification of information can be rational, primarily because they identify the process of stereotype activation as being non-conscious. Again, Fiske and Taylor (1991) present similar information that calls into question rationality of immediacy.

Other scholars present an argument that poses a serious question as to whether the online tally proposed by Lodge et al. (1995) is truly the rational decision process they suggest that it is. If decisions are primarily made based on the tally of previous information, and not the actual information, we have little confidence, based on the supplemental studies, that the information will be used correctly, or even consciously. While the idea of an online tally that circumvents the problems of rationality is certainly attractive, it does not appear that it is an improvement over the limited rationality models suggested by Zaller (1992) and others.

These three psychological theories of rationality and information processing suggest a clear possibility for how quality of life might influence political decisions. Despite their disagreements in the particulars, each approach suggests that as individuals interact with their environment, information can be processed as individual information, a theory based in Zaller's work, or as a cognitive tally mark, as in Lodge et al. (1995), or as a heuristic stereotype that provides information rich content to be used in decision making.

Thus, the psychological approach might be best termed the lived experience theory, where the iterative interaction between individuals and their environment becomes a piece of information, a heuristic, or a simple rule of thumb that is easier for individuals to grasp. Individuals then can use it in the process of decision-making. This framework, unlike the others, suggests more about the processes whereby decisions are made than a strictly positive relationship between life quality and political decision making.

This circumvents the problems of preference transitivity between individuals and does not require a uniform effect for the theory to be empirically validated. Indeed, this approach solves the problems of the resource model's ordered prediction, and the utility model's problem of preference stability. It speaks to the process by which decisions are made and instead suggests, in line with the empirical reality of previous work, that well-being is important and illustrates the difficulty of estimating the direct effect of quality of life.

The political psychology model's capability of cleanly explaining the effect on and process of life quality in decision-making, it does not preclude either of the other approaches from exerting influence in the political environment. Indeed, both the resource approach and the utility approach can be assimilated into the lived experience model's inputs and possible outcomes. Thus, a method that is cognizant of the all three theories is not just preferable, it is required for a full picture of the relationship between individual decisions and well-being.

The following chapters provide further illustrations of the theory behind the relationship between of quality of life and political and social circumstances. We explore the impact of quality of life on political social phenomena within the theoretical approaches illustrated in the voter turnout example. The three components of our overarching theory of quality of life posit that, quality of life is a resource, an end to be maximized, and a heuristic or aid for decision-making each are essential to illuminating and explaining the outcomes of the various phenomena we explore and discuss.

Chapter 6
Quality of Life and Trust

Skepticism and outright distrust of government have become the watchword of the political process in recent decades (Newton & Norris, 1999; Twenge et al., 2014). Though still too early to know the full effect, the 2016 election appears to have done little to alleviate that skepticism and likely did much to increase citizen concern over whether political institutions can be trusted. Indeed, it is possible that no single concept has launched more political campaigns than the vanguard call that we must not trust government. Political rhetoric of this sort has been of particular interest whenever a political party of minority status and the perennial repetition of the American electoral system have created an environment where trust in government is viewed as the purview of the naïve and ignorant.

Trust in others has faced a similar fate; a near constant message of the nightly news is that other people are not trustworthy and are dangerous. This message has become the lead story of nearly every nightly news broadcast, front-page news story, and internet rumor—and for good reason, it attracts an audience.

Despite the political and economic realities of these negative messages, trust in government and trust in others has long been at the foundation of the American system and most other successful experiments in democratic government. Indeed, most of democratic theory is premised on the notion that individual citizens can trust government to engage in appropriate activities and others to respect the societal rules that exist (Catterberg & Moreno, 2006; Chanley, Rudolph, & Rahn, 2000).

The erosion of political and interpersonal trust has been much maligned as a symptom of the degradation of American culture and politics. It is a real concern that continual attacks against democratic government's foundation will cause it to crumble. Volumes have been written about the need for a reinvigoration of trust between individuals and trust in government (Putnam, 1995, 2000; Twenge et al., 2014).

As a result of this aspiration, understanding what drives trust is an essential task for the political and social scientist. Similar undertakings have been attempted in a variety of settings, from experiments in deliberation to large scale activism. In what follows we suggest that individual trust is directly related to the quality of life experienced by individuals.

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Trust Literature Review

There has been a significant, aggregate decrease in trust between both individuals and individuals and the government since the late 1960s (Anderson & LoTempio, 2002; Hetherington, 1998; Rahn & Transue, 1995). Rahn and Transue note the decrease in trust that individuals have in each other has decreased significantly between generations. Further, they find evidence for Tocqueville's (1945) idea that Democracy is subverted by materialism because it deteriorates social trust between individuals. Rahn and Brehm (1997) found a correlation between social trust and trust in government, and they find that confidence in government is very relevant to trust in government. Twenge et al. (2014) document that between 1972 and 2012 Americans became less trusting of each other, large institutions like news organizations, businesses, and even religious groups.

Since 1964, the portion of citizens who feel big corporations run the government has shifted from 2/3 to 3/4 (Hetherington, 1998). Hetherington argues that the decrease in trust is related to the government's provision of social services. Citizens tend to trust governmental programs that benefit them at little to no cost and have become increasingly dissatisfied with government as policy becomes less progressive. These policy problems stem from the fact that citizens have little understanding of the federal budget, where tax dollars are spent and how much money the federal government wastes. The social programs implemented by the Great Society set high expectations for government, and politicians have had a difficult time fulfilling these policy expectations.

There have been several attempts to explain how trust occurs between a government and its citizens. The most cited of these theories is Easton's (1975) definition of diffuse and specific support. Diffuse support is general support for an authority, regardless of the outputs. It usually results from socialization or experience. Specific support, on the other hand, relates to how satisfied individuals are with the perceived authorities around them. Typically, this relates to how individuals evaluate their demands of government as being met. There have been several studies that attempted to demonstrate whether support for the government is provided through diffuse or specific support and the implications each would have (Caldeira & Gibson, 1992; Citrin, 1974; Miller, 1974).

In an effort to provide evidence for one of Easton's types of support, Miller (1974) and Citrin (1974) took opposite sides and attempted to prove how trust was given to the government. Using varying public polling data both authors endeavored to trace public trust. Unfortunately, the polling questions were not worded so as to explicitly ask about one of type of support. Miller focused on race relations to demonstrate that there is distrust in the basic institutions of government. He finds that the Vietnam War caused a basic distrust on both the Left and Right, leading to dissatisfaction with the policies by both parties. Citrin focused his argument on citizens' dissatisfaction with current policies. He found that citizens support the basic institutions and often only have issues with specific policies.

This institutional support has especially been demonstrated in approval of the US Supreme Court. Caldeira and Gibson (1992) found that support for the Supreme Court has generally been supported, despite the decrease in trust in 'government'. They attempted to distinguish between diffuse and specific support and found that most whites and blacks would block any attempts to remove the Supreme Court.

Caldeira and Gibson's (1992) work supports Citrin's (1974) claims and further buttresses his idea that policy discontent is the source of political cynicism. Additionally, Citrin acknowledges that it has become fashionable to distrust Washington; even politicians have to distance themselves in order to be elected (Hetherington, 1998). Citrin's later work with Citrin & Green (1986) found a resurgence of trust from 1980–1984 regardless of gender, economic situation, geographical location, education level and age. Even African Americans, who have been shown to be less supportive of the government, did not become more cynical during this period (Avery, 2009; Citrin & Green, 1986).

It is interesting to consider why African Americans have generally been less supportive of the government than whites. Caldeira and Gibson find that African Americans link trust with racial identification (Caldeira & Gibson, 1992; Rahn & Rudolph, 2005). There is also more approval among African Americans to make changes to basic institutions such as the electoral system. Data from the 1996 Black National Election Survey found support for a third, African American political party (Avery, 2009). African Americans have also been less supportive of the Supreme Court than whites (Caldeira & Gibson, 1992).

This earlier work started a gradual shift in the trust literature towards discovering what factors drive and foster trust. Mishler and Rose (2001) argued that trust was exogenous and rational. Early in life citizens learn the standards by which they should evaluate their trust in government, that is, trust is tied to the government's performance. The authors found strong support for their theory that trust is based on effective institutions in both the United States and post-Communist countries. Their institutional theory demonstrates that the macro level performance by the government is mediated by micro level value perceptions. They agree with Hetherington's (1998) claims that trust can be rebuilt once politicians promote policies that the public views as priorities, eliminate corruption, and protect freedoms. Additionally, they find a strong correlation between this theory of institutional trust and economic outcomes.

One of the biggest factors affecting trust is the state of the economy. Many studies have found that a positive economic outlook is necessary for citizens to have greater levels of trust in the government (Anderson & LoTempio, 2002; Chanley et al., 2000; Citrin & Green, 1986; Hetherington, 1998; Mishler & Rose, 1997; Rahn, Yoon, Garet, Lipson, & Loflin, 2009). Since the institution of the Great Society, citizens expect the government to provide a healthy economy and financial support even when the economy isn't robust. Hetherington (1998) found that poor economic conditions during the mid-1970s led to a greater decrease in trust than did the Watergate Scandal.

The Vietnam War and racial issues during the 1960s and early 1970s also affected citizen trust in government (Hetherington, 1998; Markus, 1979). Markus found that

these two issues had the greatest effect on increasing the cynicism of younger generations. In addition to this, the presence of political scandals and rising crime rates has been particularly harmful to feelings of trust (Chanley, 2002; Chanley et al., 2000; Rahn et al., 2009). Presidential image, as it relates to policy and scandals is also important to public trust of the government (Citrin, 1974; Citrin & Green, 1986). Hetherington (1998) supports this claim that Presidential image affects public trust. He explains that this is because the President has become the image that often represents the government and has taken an increasing role in dictating policy. Chanley et al. (2000) found, however, that Congressional approval ratings and scandals were more directly linked to trust. Postmodern values have also been blamed for the decline in respect for authority. Both Nye (1997) and Hetherington (1998) cite the expected role of government in creating a high quality of life being unmet as a reason for the decrease in trust.

Using American National Elections Studies data, Keele (2005) attempted to measure trust as it associated with party identification. He found that those who identify themselves as independents have less trust than those who identify with a party, even if that party is not in power. Keele cites Hardin's (1998) explanation that by associating oneself with a party that individual is demonstrating more trust because there is a willingness to rely on a party, and one is expecting that party to have actions that are relevant to him. Additionally, a person will trust the party they identify with because they do not trust the other party. Keele found that, overall, Democrats are more trusting than Republicans and that individual trust increases as the party they identify with comes into power. He also found a six-point difference in trust between partisans and their presidential administrations, a difference that switched with perfect regularity between administrations. His study confirmed earlier findings that policies affect cynicism and that the economy and presidential support are important for trust.

One phenomenon associated with dissatisfaction of the federal government has been an increase in support for local governments. This 'devolution revolution,' according to Rahn and Rudolph (2001), has given local government many powers typically reserved for national governments. Rahn & Brehm (1997) has also found that voter turnout, on a local level, has a significant correlation with trust. According to Rahn and Rudolph (2001), citizens trust their local governments when they are efficient, are perceived to maintain a high quality of life, and have mayor-council systems.

Despite this trend in local government overall trust in government has been on a downward slide for decades (Chanley, 2002; Hetherington, 1998; Twenge et al., 2014). Continual economic problems, increasing political scandal, decreasing approval of Congress, and a host of other problems have contributed to this decline. While some, such as Anderson and LoTempio (2002), and Miller (1974), are afraid that this will lead to a dismantling of the current political system, there is plenty of data arguing against this possibility. Support for individual policies and politicians overall remains low, but the fact that most incumbents win their reelection campaigns suggests voters are happy with the representatives, a speculation that is supported by some polling (Mendes, 2013; Open Secrets, 2016).

Theory

Trust as an object of interest has largely been studied by political behaviorists. It is, exhaustingly, depicted as the end result of some psychological processes whereby individuals express a willingness to trust others as a function of some set of iterative processes. More straightforwardly, trust develops over time and through a variety of experiences.

The evolution of trust suggests that a model based on an individual's lived experience, our psychology model, is the best process by which trust can be understood and for how trust may be affected by events and policies. Zaller (1992), Lodge et al. (1995), and others have suggested these sorts of models. They have as their common root the notion that as an individual interacts in the environment, that environment provides a series of cues about whether others, including government, can be trusted.

Zaller's (1992) model of receive-accept-sample, for example, suggests one process for the development of trust as information is acquired. In Zaller's theory information is received, accepted or rejected, and then sorted into the individual's knowledgebase. When relevant questions appear, individuals can call on the stored information and sample from it what they need.

Zaller's ideas have been criticized because they are so cognitively taxing and because it is unlikely individuals store such vast amounts of information for future use. By contrast, Lodge et al. (1995) suggests the use of heuristics, or shortcuts, so that information can be reduced and stored more compactly. Specifically, Lodge et al.'s model of decision-making for the average citizen works like a tally sheet where new information is tallied in relation to a specific decision, idea, or individual, but no specific information is kept. According to this framework, individuals know little about the things they decide on, but have a general sense of their overall feelings towards a policy, individual, or topic.

Neither approach, Zaller or Lodge et al., suggests individuals use no information or know nothing about the topic, but rather depict the way individuals employ their information in different ways. Both methods, however, conclude that individuals learn from events and through interacting with their environment. It is clear that information about life quality, whether received and accepted or simply tallied, becomes a part of the processes whereby individuals formulate decisions and take action. Given this fact, it is clear that if life quality is being used by individuals to make decisions, such as those about whether to trust others and government, it should be possible to identify a unique effect of that life quality on those responses.

Hypotheses

Our theory suggests two hypotheses about two types of trust. The first is focused on trust for institutions of government and the second focuses on interpersonal trust, or trust in others. Given that the lived experience theory suggests only that an effect will be present, our first hypothesis recognizes that an expression of trust in government is likely to be directly linked to outcomes like quality of life. Our first hypothesis is that respondent's trust in government is related to their measured quality of life and our second hypothesis is that a respondent's trust in others will be related to their measured quality of life. Given these hypotheses the null hypothesis in both cases is that no relationship exists.

These hypotheses seek to test only whether quality of life is in fact related to trust in others, including government as this is a beginning foray into the relationship between quality of life and trust. They therefore do not provide a complete justification for increasing quality of life as a strategy to improve trust in others and institutions, but instead suggest whether such an endeavor might be fruitfully explored in future work.

Methods and Data

The data for this paper includes data from the 2004 National Election Survey (NES) and our constructed 2005 quality of life index. This analysis draws on these constructed quality of life measures and combines them with the NES responses to explore the effect of life quality on expressions of trust. Not every county in the United States is represented in the NES survey and we match respondents with the data for their county.

As we detailed in Chaps. 3 and 4 our preference is for open data availability as such we use only publicly available data. Chapters 3 and 4 as well as the appendices include more information about the quality of life index and information about the variables we used, to aid replication and verification of the index.

National Election Survey Data

The survey data used in this analysis is taken from the 2004 National Election Survey (NES) conducted during the presidential election season. The NES is a face-to-face survey utilizing a probability sample and has been extensively used by scholars to study a variety of political and social structures.

The 2004 NES was conducted from September 7, 2004 until November 1, 2004 with a post-election series from November 3, 2004 to December 20, 2004. The 2004 study produced 1212 interviews, which were face-to-face interviews, of

approximately 70 min. The 2004 NES included a series of questions about trust (F2Q3. INTRODUCTION – TRUST IN GOVERNMENT) and we use two questions from this section to test our hypotheses. Further, we use information collected about respondents and other responses to questions as control variables.

We use the NES's generic trust question to test the proposition that general trust is higher in high quality of life areas. We specifically use the question, "Can People Be Trusted?" (P045158 Q216.f2k3). we use Logit to appropriately account for the structure of the data in the dependent variable; the data is Coded 1 for "Can be trusted" and 0 for "Can't be too careful".

The question's wording is as follows:

> Turning to another topic. Generally speaking, would you say that MOST PEOPLE CAN BE TRUSTED or that you CAN'T BE TOO CAREFUL in dealing with people? VALID CODES: 1. Most people can be trusted 5. Can't be too careful MISSING CODES: 8. Don't know 9. Refused.

To test the proposition that trust in government is higher in high quality of life areas we use P045149, Q207.f2q3a. "Trust Government To Do What Is Right" question from the post-election survey.

The question wording is as follows:

> How much of the time do you think you can trust the government in Washington to do what is right -- JUST ABOUT ALWAYS, MOST OF THE TIME, or only SOME OF THE TIME? Responses are coded as: 1. Just about always 2. Most of the time 3. Only some of the time 4. Never {VOL} MISSING CODES: 8. Don't know 9. Refused.

Because the question asks respondents to rank order their level of trust in government from 1–4 with 4 being "Never", we reverse the order of responses so that higher responses indicate more trust and use Ordered Logit to test our hypothesis.

Tests and Results

Using the survey results from the 2004 National Elections Survey (NES) and our quality of life score we run two sets of regressions to test each of our hypotheses. we begin with a simple bivariate approach to establish a baseline for the relationship, the results of which are included in Tables 6.1 and 6.2 and then advance on to a more robust multivariate approach which allows both hypotheses to be tested in light of various competing and plausible alternative explanations for respondent's reported trust in others and in government.

Table 6.1 Trust in others (V045186)—logistic regression. Observations 1058. Pseudo R Sqr 0.0112

Variable	Odds ratio	Standard error	P value
Quality of Life	10.62	6.30	0.000***

*P < 0.10; **P < 0.05; ***P < 0.01

Table 6.2 Trust in government—ordered logit. Observations 1058. Pseudo R Sqr 0.03

Variable	Coef	Standard error	P value
Quality of Life	−1.4694	0.573	0.01***
Cut 1	−2.9673	0.2064	
Cut 2	−0.1773	0.1433	
Cut 3	−4.7330	0.311	

*P < 0.10; **P < 0.05; ***P < 0.01

The results from both bivariate regressions indicate that we can reject the null hypothesis of no effect and that life quality as measured by our index has a statistically significant relationship with the reported levels of trust from the 2004 NES respondents. In the first analysis, Trust in Others, the direction of the effect is that as life quality increases, the odds that a respondent would indicate that people can be trusted most of the time increased substantially. In contrast, however, the ordered logit returns a negative coefficient that indicates the relationship between life quality and trust in government is negative. Thus, these results suggest that as life quality increases, individuals are more trusting of each other and less trusting of government. Further, they confirm the theory presented above that trust is determined, in part at least, through a process where lived experience is included in the formulation of a response.

We include controls that fall into three categories: interview scenario variables—to account for variations in the interviewing context, personal situation variables—to account for demographic and other personal characteristics, and political ideological measures—to control for ideological effects on trust. Each of these categories has been hypothesized as related to trust, and to properly specify the model they must be included. To maintain consistency, we use the same control variables in both regressions. The interview scenario control variables are: interview form, which identifies the question format used and is coded as a dichotomous variable, length of interview, the length of the interview in minutes, and payment amount, the amount paid to the respondent for completing the interview.

The personal characteristic variables include: household size, including all those residing in the household, children in the household, those under 18 years of age residing in the household, male (coded dichotomously), single family home, whether the residence is a freestanding single family dwelling, better off than 1 year ago, whether the respondent feels he or she is better off today than last year, religion importance, coded as 1 for important 0 for not important, urban scale, a five point scale from rural to urban, visible security, measured as whether security measures, including alarm systems, barred windows, or other security precautions beyond lock and key, are taken at the residence, age, in years, marital status (1 for married and 0 for unmarried), years of education, the total number of education years completed by the respondent, employment status (1 for employed 0 for not employed), and a variable for white depending on whether the respondent is white or non-white.

Table 6.3 Trust in others- logit. Observations 995. Pseudo R2 0.0749

Variable	Coef	Robust standard error	P value
Vote in 2000?	1.217	0.2116	0.25
TV News Days	0.9815	0.0262	0.48
Household Size	0.8993	0.1017	0.34
Children in Household	0.9243	0.1293	0.57
Male	1.059	0.1535	0.68
Single Family Home	0.8714	0.1911	0.53
Political Signs	1.1047	0.0919	0.231
Better off than 1 year ago?	1.9212	0.9261	0.17
Religion Important	0.8590	0.1309	0.31
Interview Form	0.9420	0.1614	0.72
Length of Interview	0.8755	0.0673	0.08*
Payment Amount	1.0020	0.0033	0.53
Urban Scale	0.9962	0.0059	0.52
Visible Security Measure	1.0290	0.0801	0.71
Country on Right Track?	1.0755	0.2207	0.72
Liberal Conservative Index	1.4795	0.2361	0.01***
Democrat	1.5370	0.3010	0.02**
America Shame?	1.1095	0.1905	0.54
Age	0.8209	0.1586	0.30
Married	1.0160	0.2133	0.00***
Years of Education	1.2702	0.2133	0.15
Employment Status	1.2196	0.0412	0.00***
White	1.5003	0.2664	0.02**
Quality of Life	8.2011	5.6651	0.00***

*P < 0.10; **P < 0.05; ***P < 0.01

The political and ideological measures include many that have been shown to be important and have strong theoretical justifications for their inclusion: Voter turnout in 2000, self-reported by the respondent, TV news days, the number of days a respondent tuned into the television news, political signs, whether the interviewer observed political signs at the residence, the respondent's answer to is the country on the right track?, whether the respondent reports that he or she believes the country is on the right track, liberal conservative index, a seven point scale from very liberal to very conservative, democrat, whether the respondent identifies as a Democrat, America shame (response to the NES question regarding whether the United States has engaged in any activity that the respondent feels shame for). Using these control variables and our quality of life score, we test each of the hypotheses again and include the results in Tables 6.3 and 6.4.

The results from the logistic regression are reported as odds ratios—whether increases in the variables make it more or less likely that the respondent will report that he or she trust others. These results indicate that as our quality of life scale increases, it is substantially more likely that the respondent will indicate that they

Table 6.4 Trust in government.—ordered logit. Observations 995. Pseudo R2 0.0743

Variable	Coef	Robust standard error	P value
Vote in 2000?	−0.1798	0.1649	0.27
TV News Days	0.0088	0.0252	0.72
House Hold Size	0.0640	0.10450	0.54
Children in Household	−0.1786	0.1292	0.16
Male	−0.1546	0.1373	0.36
Single Family Home	−0.0120	0.0780	0.87
Political Signs	0.0661	0.4443	0.88
Better off than 1 year ago?	0.2346	0.1436	0.10*
Religion Important	0.2878	0.1655	0.08
Interview Form	−0.1337	0.0725	0.065*
Length of Interview	0.0017	0.0082	0.58
Payment Amount	−0.0109	0.0056	0.05**
Urban Scale	−0.0310	0.0619	0.83
Visible Security Measure	−0.1444	0.1940	0.45
Country on Right Track?	0.9857	0.1515	0.00***
Liberal Conservative	−0.2734	0.1925	0.15
Democrat	−0.1164	0.1626	0.47
America Shame?	−0.4782	0.0054	0.00***
Age	0.0097	0.0054	0.07*
Married	−0.1750	0.1575	0.26
Years of Education	−0.0638	0.0805	0.08*
Employment Status	0.2656	0.1610	0.09*
White	0.2443	0.1674	0.14
Quality of Life	−1.1289	0.6501	0.08*
/Cut 1	−5.1789	0.73062	
/Cut 2	−0.4235	0.6734	
/Cut 3	2.9240	0.6882	

*P < 0.10; **P < 0.05; ***P < 0.01

trust others. These results further confirm that we can reject the null hypothesis of no effect and are substantively similar to those from the bivariate regression albeit with improved model fit and explanatory power.

To test our second hypothesis, we used an Ordered Logit because the dependent variable was structured as an ordered scale from 1 to 4. Here the results are reported not as odds ratios, but as OLOGIT coefficients, which are not directly interpretable. However, like our first hypothesis, the results of the bivariate regression are confirmed and quality of life remains a statistically significant predictor of trust in government.

Taken together, the results from both the bivariate and multivariate hypothesis tests make it clear that the null hypothesis of no effect can be rejected. Also, it seems that quality of life is related to articulations of trust—positively in the case of interpersonal trust, and negatively in the case of government.

Understanding Quality of Life and Trust

These results appear to confirm the notion of the larger theory of how individuals use information from their environment and how something like quality of life can exercise an effect on decision-making even when controlling for other variables concerning the background against which individuals live their lives and make decisions. These results further bolster the long-standing assertion by those who study quality of life that life quality is an important part of the socio-political environment and that failing to consider the effects of life quality can result in a skewed understanding of the political and social world (Newton & Norris, 1999; Twenge et al., 2014).

Despite the confirmation of the importance of quality of life, these results paint a somewhat contradictory picture about how life quality influences the development and expression of trust by individual respondents in the 2004 NES. On one hand, higher life quality is related to higher interpersonal trust—an outcome the literature would laud as improving democratic practice and outcomes. But on the other, higher life quality is related to lower trust in government—a result that has seemingly negative implications for democratic outcomes and practice. However, these results are not necessarily as contradictory as they seem at first glance.

If we begin with the assumptions of the utility model of decision making, these results make much more sense. The first axiom of any utility model is that individuals prefer more utility to less utility and the same might be said of life quality. It would be difficult to highlight a situation where an individual, all else equal, prefers a lower quality of life to a higher one. Building from this assumption, that the preference for quality of life is part of the single peaked utility function of the economists models, two types of actions are likely to provide an explanation of the actions and decisions made by individuals. First, they might take actions that they believe are likely to increase their life quality or, at least, leave it in the steady state. Second, they might take defensive action to prevent a reduction in that life quality by proactively preventing change to that steady state by others.

Indeed, if this is the case, an individual's experience may indicate that trusting others leads to an increase in quality of life or, at least, has failed to negatively impact in past decisions. Deciding to trust is a low-cost decision and one that the individual can, with some accuracy, predict the outcome of that decision. Further, if individuals perceive government as having a primarily negative impact on their quality of life, a reluctance to trust government is a likely outcome. Ultimately, these tests reveal that individuals are likely using their understanding of well-being as a heuristic in decisions on whether or not to trust others and the government.

Chapter 7
Quality of Life and Direct Democracy

The essential logic of direct democracy measures is to offer another avenue for those who want to make their voices heard if they believe their concerns are not being attended to in the normal legislative process. For example, initiatives and referendums that circumvent the legislature constitute a means for individuals to place questions openly to their fellow constituents. Those working to place such measures on ballots are obviously doing so to promote their quality of life.

Defenses of direct democracy can be couched in the need to provide those without the means to lobby the legislature another opportunity to enact policies they prefer. Other defenses cite the nature of republican representation and argue that since the power to legislate derives from the consent of the governed, the governed are thereby empowered to make law for themselves.

As with all political instruments, however, these measures are subject to manipulation by interest groups who want to make their interests appear as if they are grassroots movements, a practice colloquially known as astroturfing. This means it is not clear whose voices are truly represented and to what degree. For example, it is not necessarily true that the people direct democracy measures are meant to empower actually have the time to utilize the tools. Without the time or resources, those direct democracy is meant to help may not have meaningful access to them. Others with more resources, however, may be able to use direct democracy measures for their own ends. Simply put, once a tool is created it is open to use by political parties and interest groups as well as the general citizenry.

Direct democracy ballot measures are primarily interesting to those who wish to study quality of life because they present difficult questions about who benefits and how as well as who votes for direct democracy initiatives. The solutions are not obvious and there are compelling theoretical reasons for multiple hypotheses. For example, by pairing our public choice backgrounds with our understanding of behavioral economics and political psychology we could theorize that individuals in high quality of life areas may be risk averse to changes and vote against them. Yet, it may be completely the opposite that those enjoying a high quality of life may have such privilege in part because of their involvement in direct democracy. Though

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much less exciting, we must also admit that it is possible that direct democracy does not relate to quality of life and any appearances to the contrary are fanciful.

Voting on direct democratic questions are part of voice and participation in a democratic society (Hirschman, 1970), but here we extend this idea to examine what voters may be saying with their participation and what they hope to achieve for their life quality. As in the prior examples of voter turnout, we find positive relationships with quality of life and activity in elections. But the importance of elections is often much more about the outcomes and there our results are more novel. We find that higher quality of life generally is associated with both fewer votes in favor of initiatives and referendums and fewer measures passing. At first these results seem counterintuitive to our wider theory of quality of life and direct democracy, but after accounting for the differences between the average citizen and the average petitioner, they become straightforward and simple to explain.

Direct Democracy

Direct democracy elections are largely similar to normal elections. They face issues of salience, demographic and turnout problems, the level of voter knowledge about the issues under consideration, and face problems in designing their ballots to properly facilitate voting. These general problems that every election faces are usually considered to have greater effects in votes on direct democracy measures.

Initiatives and referenda often complicate voting for individuals. This is one aspect of why voter turnout is lower for these elections and supports the theory that citizens know little about ballot initiatives (Lipow, 1973; Magleby, 1984; Pillsbury, 1931; Schmidt, 1989). Magleby (1984) shows that only some opinions are represented through direct democracy measures in part because of the lack of general education on the subject – especially on technical questions.

Ballot measures are often particularly complex and also lack some of the cues voters use when voting in other elections (Magleby, 1984). For instance, there is not often a political party associated with a ballot measure and so people are less likely to turnout for the election (Hawley, 1973; Lee, 1960; Schaffer, Streb, & Wright, 2001).

Voters are also less likely to be interested in direct democracy elections, that is, these votes tend to not excite people as much. Even though the strict Downsian model of voting would suggest people stand to gain greater benefits in smaller elections, people tend to show up for and know more about national elections. Scholars have proposed many reasons for this paradox. For example, national elections may create more information rich environments than local or state elections (Nicholson, 2003, 2005) and be subject to greater media coverage (Bowler, Donovan, & Happ, 1992). The topic of national races is also likely to encourage voters to pay attention and ultimately vote (Darcy & Schnider, 1989; Magleby, 1984; Nicholson, 2005; Vanderleeuw & Engstrom, 1987).

Far from being inert message carriers, ballot design is also important. The ballot's length, for example, is thought to play a role in whether or not voters turnout or if they "roll off", complete only a part of the ballot (Brockington, 2003; Darcy & Schnider, 1989; Kimball & Kropf, 2006; Magleby, 1984; Nichols, 1998; Nichols & Strizek, 1995; Taebel, 1975; Walker, 1966). These fit well with the Downs (1957) theory of voting because it indicates individuals are only willing to vote when the costs are low.

Reilly (2010) argues that vote choice is another important factor. She contends that voting is not simply about developing policy preferences about a range of issues. Instead, scholars must consider how individuals then actually display those thoughts when voting.

The overall research is clear, however, that more knowledge is likely to translate into increased turnout rates in elections (Bowler et al., 1992). A voter who participates in an election on a ballot measure is far more likely to be informed on that question than the average voter. Here the ability for voters to be informed through campaigns for or against ballot propositions is obvious and ties to another affecting these elections, the spread and expansion of single issue voting (Nie, Verba, & Petrocik, 1979). Voters are increasingly likely to make their decision on who to vote for with only an eye towards a specific issue they care about to the exclusion of other considerations. Rauch (2015) goes so far as to connect this trend to Congressional gridlock, partisanship, and the decline in centralized party power. For direct democracy measures, however, single issue voters seem to be motivated to vote by them (Nicholson, 2003, 2005).

There are few, if any, direct links between quality of life and direct democracy in the literature beyond earlier work by Yonk and Reilly (2011). The closest existing literature approaches is the relationship between turnout and socioeconomic factors such as race, income, and education levels (Branton, 2003; Vanderleeuw & Engstrom, 1987). Since nonwhite peoples, low-income groups, and the uneducated are the least likely to turnout, it sometimes appears that these elections are really the domain of elite players in society. A more positive note, however, is that corporations and large businesses seem less interested in ballot measures than individuals seeking to uphold their desires (Gerber, 1999; Matsusaka, 2004). This is likely, however, simply because these groups already have established relationships in legislatures and as such may not need the secondary route to affect policy.

Theory and Hypotheses

Of our theories of the interaction of quality of life and political outcomes, the utility maximizing and psych models are the best and most obviously suited for examining voters' behavior in elections. The utility maximizing model suggests that individuals will decide to vote in favor of a ballot measure if they believe it will improve their quality of life. With this in mind we expect that ballot measures are a path for individuals to improve their lot and that more votes and more initiatives will pass in higher quality of life areas.

Change however, under the political psychology model we described, is threatening. It may be that those with high life quality will see changes as unnecessary and even harmful – essentially that they will be risk averse. This theory predicts that ballot measures will receive fewer votes in high quality of life areas and be less likely to pass.

An interesting point, however, is that in both of these theories our prediction for voter turnout will be positive. In the first, people will vote to secure the additional welfare and in the second, turnout to prevent changes they fear.

These ballot measures have been on the rise (Reilly, 2010) despite the decreasing levels of societal trust. They are unique as the only elections where individuals can lay out a proposal to others directly without moving through the legislature in the normal fashion (even when they are proposed by legislators they are still unique in this way). This phenomenon presents an interesting opportunity to examine the relationship between such elections and the well-being of those they impact. Our index is a county-level, but because these elections tend to be state-wide we calculate state-level scores to test our theories.

Methods and Data

Our data on ballot measures includes those from 2006 through 2014. The earlier data is from Reilly's (2010) database, while the later data we collected ourselves from Ballotpedia and state websites. Our quality of life scores are calculated for each state and we use the 2005 and 2010 scores for quality of life. Together these datasets can illustrate the effect of well-being on the election turnout, rate of passage, and approval of ballot measures.

It is worth noting that Reilly (2010) constitutes an expansive dataset including factors such as position, roll-off (the number of people who vote for the top of the ticket, governor or president, but do not complete each item on their ballot), readability, and other information about the ballot voters actually see. Since we believe these factors are unlikely to be related to quality of life we excluded them in our analysis. Reilly's (2010) is an extensive dataset created by contacting each state and accessing their electronic archives of results and we supplement that data set with additional data as needed. Future work should explore if there are important relationships between roll-off, readability, and other characteristics of the physical ballots that voters actually see and quality of life.

Tests and Results

For our purposes, we examine voter turnout in the election, the votes for the ballot measure, and whether or not the measure passed in the election. First, using simple ordinary least squares regression (OLS), we regress our quality of life index scores on voter turnout while controlling for other already established factors in voter

Table 7.1 Voter turnout 2005. Observations 310. R-Square 0.5163

Variable	Coef	Robust standard error	P value
Quality of Life	0.2243	0.0625	0.000***
Percent Men	0.0001	0.00002	0.000***
Median Age	0.0039	0.0033	0.240
Percent High School Grad	−0.0013	0.0021	0.542
Percent College Grad	−0.0008	0.0013	0.528
Unemployment Rate	0.0137	0.0042	0.001**
Median Income	1.20e-07	8.31e-07	0.885
Percent African American	−0.0055	0.0008	0.000**
Percent Hispanic	−0.0019	0.0006	0.001**
Population	−1.87e-09	4.57e-10	0.000**

*Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

Table 7.2 Voter turnout 2010 – OLS. Observations 310. R-Square 0.5163

Variable	Coef	Robust standard error	P value
Quality of Life	0.2469	0.0705	0.000***
Percent Men	2.546	1.2195	0.037**
Median Age	0.0144	0.0036	0.000***
Percent High School Grad	−0.0099	0.0023	0.000***
Percent College Grad	−0.0021	0.0049	0.671
Unemployment Rate	0.0112	0.0028	0.000***
Median Income	4.33e-07	8.97e-07	0.629
Percent African American	−0.0019	0.0005	0.001***
Percent Hispanic	−0.0022	0.0003	0.000***
Population	−4.82e-09	1.02e-09	0.000**

*Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

turnout. Our results, available in Tables 7.1, and 7.2 are clear that higher quality of life is associated with higher voter turnout in such elections just as in our previous analysis of quality of life and turnout at the county level.

Our findings here support our belief that, no matter if the logic is utility maximizing or risk aversion, well-being is associated with greater voter turnout. The results indicate that a one point increase in quality of life is associated with an increase in voter turnout in both of our waves of quality of life index. The other results can be interpreted similarly and show what is commonly expected for each variable. Voters appear to be willing to go to the polls to represent their interests. This test, however, cannot speak to the effects or even intentions of those votes. It is still possible for voters to be motivated by either theory.

To test the intentions of voters and the ultimate effect of their votes, we use two different methods. First, another ordinary least square regression on votes for ballot measures to determine if quality of life increases votes for measures as the utility theory predicts or decreases them as the risk aversion theory predicts. The second method is a logistic regression aimed at considering the probability of a measure passing.

Table 7.3 Votes for ballot measure 2005 – OLS. Observations 188. R-Square 0.8852

Variable	Coef.	Robust standard error	P value
Quality of Life	−24373.28	886076.6	0.007***
Percent Men	39560.78	71888.52	0.583
Median Age	−16425.09	26154.17	0.531
Percent High School Grad	30955.38	19443.19	0.113
Percent College Grad	19959.07	11961.33	0.097*
Unemployment Rate	52396.58	39589.6	0.187
Median Income	5.9003	8.438	0.485
Percent African American	54427.98	10644.33	0.000***
Percent Hispanic	3808.103	7579.43	0.616
Population	0.1183	0.0115	0.000***
Roll-off percent	−1,216,100	513,984	0.019**
Voter Turnout	2,553,057	504463.7	0.000***
Initiative Dummy	−174887.8	97109.5	0.073*
Legislative	200012.2	97398.29	0.042**
Popular Referendum	−184859.5	173418.5	0.288

*Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

These tests reveal which theory, the utility maximizing or risk aversion theory, is more likely to hold sway or if both are incorrect. More votes for a ballot measure and a higher passage rate would provide strong evidence in favor of the utility maximizing theory as it would mean voters are showing up to improve their quality of life by voting in favor of the proposals. It shows individuals believe these changes will improve their well-being.

In contrast, results that show a decreased number of votes for ballot measures associated with higher quality of life scores and a lower likelihood for passage are powerful evidence against the utility maximizing theory and in favor of the psych model's prediction of risk aversion. The individuals appear to be acting as if they want to protect the quality of life they have and using their current condition as a heuristic to vote against changes.

It is also possible that quality of life will have no relationship with either votes for the measures or whether or not a measure passes. In this case we have no evidence in favor of either theory, but some reason to believe there is not a meaningful relationship between quality of life and whether or not ballot measures pass. In the light of the previous test, such results would show that quality of life is only associated with voters going to the polls and not the way that they vote.

Our test results are in Tables 7.3, 7.4, 7.5, and 7.6 for each of the years of our index. The first test explores total votes for the ballot measure in Tables 7.3 and 7.4. Tables 7.5 and 7.6 present ballot measure passage. The tests supply differing evidence for the risk aversion hypothesis derived from the psych theory and are detailed below. What is clear is that, at least in terms of the total votes for a ballot measure, there is a relationship between quality of life and those total votes, while there

Table 7.4 Votes for ballot measure 2010 – OLS . Observations 606. R-Square 0.7832

Variable	Coef.	Robust standard error	P value
Quality of Life	9022.562	2357.642	0.000***
Percent Men	−1.68e07	5,557,121	0.003***
Median Age	17,185	19689.62	0.383
Percent High School Grad	5980.203	10,620	0.574
Percent College Grad	−34936.36	24297.21	0.151
Unemployment Rate	58283.11	20573.81	0.005***
Median Income	13.0461	4.7995	0.007**
Percent African American	2175.699	3695.195	0.556
Percent Hispanic	−2485.626	2243.044	0.268
Population	0.1089	0.0063	0.000***
Voter Turnout	4,060,964	304053.8	0.000***
Initiative Dummy	−63397.11	109365.3	0.562
Legislative Referendum	−16648.86	95134.5	0.861
Popular Referendum	−412122.9	131760.6	0.002**

*Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

Table 7.5 Ballot measure passage – logistic regression. Observations 188. Pseudo R-Square 0.2500

Variable	Odds ratio	Robust standard error	P value
Quality of Life	4.80e-06	0.0003	0.067*
Percent Men	1.52132	1.1701	0.586
Median Age	0.9293	0.1647	0.679
Percent High School Grad	0.6835	0.1084	0.016**
Percent College Grad	1.2811	0.1326	0.017**
Unemployment Rate	1.3298	0.3235	0.241
Median Income	1.0001	0.0757	0.697
Percent African American	1.059	0.0757	0.423
Percent Hispanic	0.8850	0.0614	0.078*
Population	1	5.58e-08	0.697
Voter Turnout	0.2095	0.9228	0.723
Initiative Dummy	1.3236	1.8637	0.842
Legislative Referendum	7.7324	10.8659	0.146
Popular Referendum	0.2321	0.4079	0.406

*Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

seems to be no identifiable relationship between quality of life and if those same measures are being enacted into law.

Table 7.2 shows that each one unit increase in our quality of life index is associated with a decline in votes for ballot measures, while Table 7.3 is associated with a modest increase in votes for the ballot measure. Based on these results we have evidence that there is a relationship, but contradictory evidence in the direction of the relationship as well as inconsistent evidence as to which theory is likely active.

Table 7.6 Ballot measure passage 2010- logistic regression. Observations 605. Pseudo R-Square 0.0932

Variable	Odds ratio	Robust standard error	P value
Quality of Life	0.9912	0.0090	0.339
Percent Men	3.23e-20	6.72e-19	0.030**
Median Age	0.9184	0.0741	0.292
Percent High School Grad	1.2073	0.0850	0.007***
Percent College Grad	1.0744	0.1132	0.496
Unemployment Rate	0.7499	0.0696	0.002***
Median Income	1.0001	0.0002	0.565
Percent African American	1.0132	0.0150	0.375
Percent Hispanic	1.0142	0.0108	0.184
Population	1	1.65e-08	0.611
Voter Turnout	0.0874	0.0824	0.010***
Initiative Dummy	1.3282	0.4053	0.352
Legislative Referendum	1.8421	0.4830	0.020**
Popular Referendum	0.6428	0.3194	0.375

*Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

A possible explanation for this divergence of results lies in the fact that the 2010 voters were still in the midst of the large-scale downturn and would be more likely than their 2005 counterparts to want to push for substantial change. A second explanation may lie in the results of the 2008 presidential election where President Obama's message of hope and change activated many voters to re-engage the political process as a mechanism for solving problems. What seems clear from both results is that the aggregate effect of each individual's view of their own status and a desire to preserve or change that status as predicted by the psych model is likely active. Though the utility model is useful, it appears that once voters have a high standard of living they work to maintain that level, and only in the post crisis era do we see a willingness to vote for ballot measures.

We are also interested in the passage of those ballot measures because yes votes are only one outcome from an election and not the most important one. As we should be expected after investigating the results in Table 7.2, the results in Table 7.5 indicate that ballot measures are less likely to pass in areas with higher quality of life, but we find no relationship in the 2010 data shown in Table 7.6.

Unlike the contents of Tables 7.3 and 7.4, which supported the psych model's prediction of behavior consistent with individual's risk perception, the results of 7.5 provide weak evidence while Table 7.6 provides no evidence of statistical relationship although the direction is consistent. Life quality, as measured by our 2005 index, results in an odds ratio that is less than one and statistically significant and our 2010 index results in an odds ratio less than 1 but statistically insignificant. The utility maximizing model predicted an odds ratio of more than one because that would mean measures would be more likely to pass with higher levels of quality of life and would represent individuals adapting their policy climate to suit their needs and further raise their well-being. It is worth noting, however, that the utility maxi-

mizing model may also have predicted people stepping out to vote down bad ballot measures, but this assumes voters have extensive information about the probable effects of such ballot measures. That assumption is in conflict with the field's consensus about knowledge levels of voters and ample empirical evidence (Bowler et al., 1992; Converse, 1964; Lodge, Steenbergen, & Brau, 1995; Magleby, 1984; Popkin, 1991; Reilly, 2010; Reilly & Richey, 2011; Zaller, 1992).

Ultimately, we believe the psychological theory's position that these results show that voters in high quality of life areas are risk averse and will act to protect their living standards. It demonstrates some distrust of change, but fundamentally it also seems strange. Why are ballot measures increasingly common (Reilly, 2010; Yonk & Reilly, 2011) and yet apparently viewed as a threat to voters' quality of life? The disconnect is based on a difference between the average voter and the average petitioner. A petitioner sees something amiss in the community and takes actions to resolve this problem. The problem, however, may not be affecting others as much or it may not be considered a problem to the average vote. Consider one of the most common ballot initiatives, legalizing marijuana. The person who approaches you to sign their petition for legalization in their tie-dye shirts obviously views this as a serious problem, but the average voter may not. An average voter may even hold the opposite view or fear that the change will lower their quality of life.

This theory of a disconnect between petitioners and normal voters is clarified in earlier work by Yonk and Reilly (2011). They illustrate this argument by examining Oregon and comments made by petitioners as well as by comparing demographic information about those who are petitioners and the average voter in the state. They confirm previous literature that petitioners are older and bear other differences as well (Wolfinger & Rosenstone, 1980). Petitioners, for example, are the busybodies of the community. They are more likely to be active members of social groups and community groups than other citizens. They are active and engaged citizens who are involved in activism to, as they see it, improve the quality of life of their communities (Putnam, 1995, 2000). It appears petitioners are those who most take to heart and take advantage of the idea that direct democracy is another avenue to create change.

Yonk and Reilly (2011) also reveal that those petitioners viewed themselves as improving the quality of life of the community. Our statistical work suggests that the wider community, however, disagrees. It appears that even though citizens have the ability to bring measures forward for votes to attempt to improve the quality of life of their communities, they do not have the more vital ability to pass those changes. Petitioners had identified a problem, had a vision of a better way, and then acted to bring it about. Unfortunately for these activists, however, their preferences may diverge far from the median voter's preference for the status quo.

Even though direct democracy ballot measures appear more likely to fail in high quality of life areas, it isn't necessarily true that they are without purpose or effect in the public policy process. First, some pass and become law, affecting the change the petitioners envisioned. Second, direct democracy appears to have several beneficial effects. The educational campaigns they are associated with improve societal knowledge, an understanding of political issues, and engage people with their local

communities. After controlling for the effects of gender, income, partisanship, media consumption, political efficacy, and racial demographics, research has found citizens in states with greater numbers of ballot initiatives also have better understanding of their state's political sphere and events (Smith & Tolbert, 2004). Other research has found that having important ballot measures voted on increases turnout for midterm elections when it usually flags, though their inclusion on presidential elections appears insignificant (Smith, 2002). Education is one of the five indicators used to create our index of quality of life and it is likely that such ballot measures may improve the quality of life of an area even if they do not become law. So, ballot measures may be having beneficial effects on a community, but just not in the way the petitioners intended.

Well-being in communities with more direct democracy may also benefit from more civic engagement. Since individuals tend to learn by repeatedly being introduced to materials and information, having regular campaigns on issues of concern to members of the community may improve the living standards, albeit in a roundabout way through civic engagement (Smith & Tolbert, 2004; Tolbert, McNeal, & Smith, 2003). Citizens may also benefit merely by knowing they can play a part in making policy.

Further our results reveal an interesting interplay between quality of life and direct democracy that is not apparent under first appearances. Direct democracy and life quality appear to be powerfully related and in unusual ways. Voter turnout and quality of life seem to move together, but quality of life and the votes for and passage of ballot measures are inversely correlated as voters attempt to play a part in elections, but only to the degree to safeguard their existing well-being. Since behavioral economists and psychologists have long had evidence that individuals are, as a general rule, risk averse, these results fit within the existing literature (Kahneman, 2011).

Our application of our quality of life index to questions of direct democracy further expands the literature on both direct democracy and quality of life and validates much of the previous literature on both (Reilly, 2010). We uniquely examine not just the turnout for direct democracy questions, but the interaction between quality of life and direct democracy. We identify a new state-level phenomenon that voters are, when their local areas are concerned, risk averse. Still, there is much research to be done at lower levels of government. The study of local politics could benefit from similar examination.

Along with those who study quality of life and direct democracy, scholars of voting, public choice, political economy, and behavioral economics will find our results interesting as they reveal fascinating insights into the ways that different interest groups interact. Further, it shows how quality of life might be considered as creating an interest group that will work to protect itself and its interests. For example, the ballot measures petitioners advance may attempt to prevent continued rent seeking by those with higher quality of life in an area, perhaps by liberalizing zoning restrictions or other regulations preferred by the elites and for which the poor bear the costs. Those who benefit from the hypothetical regulations, however, are likely to band together to maintain them (Olson, 1965).

Chapter 8
Local Tax Ballot Measures and Quality of Life

The previous chapter empirically showed how ballot measures are both less likely to garner support and to pass in areas with high life quality and was focused on state level ballot measures across a variety of subjects. This finding looked at all ballot measures regardless of content or subject. We treated ballot measures about legalizing marijuana as if they were the same as ballot measures on any other subject. In this chapter, we refine that and concentrate on only local ballot measures involving a tax increase. Our interest in this narrower set of ballot measures is twofold. First, we are interested in ballot measures where the quality of life is more homogeneous to better test the effect, and second we are interest in better understanding the impact of quality of life on decisions that have a direct and more immediate effect on the voter.

Direct democracy ballot measures sometimes place questions in front of the electorate that otherwise would not receive any attention because of their politically contentious nature. Politicians, for example, may be wary of proposing tax increases even for efforts that the general population would support. This is a particularly common strategy for reformers and previous analyses have shown ballot measures may be an effective means form of passing otherwise politically contentious reforms or tax increases (Yonk, 2013). Circumventing the legislature appears to be a valuable avenue for policy changes that could not otherwise occur.

We examine the relationship between quality of life and county tax increases in the state of Washington. Our results show that individuals are more likely to vote in favor of tax increases in areas with higher quality of life scores, but, contrary to earlier findings (Yonk, 2013), it is not more likely that ballot measures including a tax increase will pass. We expect that this is a result of a tradeoff individuals are willing to make. In the long run, voters expect these tax increases to improve their county and they are willing to bear the costs in the short-term. It does not appear, however, that enough voters believe this to garner the sufficient votes to pass taxation initiatives.

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Theory: How Do People Choose Their Vote?

One assumption of our utility maximizing theory is that individuals are able to discern which choices are utility maximizing and make the correct choice. This is a strong assumption since it may not be that individuals are able to make such decisions correctly (Kahneman, 2011). After all, there is good evidence individuals are poor maximizers when presented survey questions (Campbell, Converse, Miller, & Stokes, 1960). A weaker version of the assumption may be that even if people make poor choices, they still learn from those choices and can make utility maximization choices correctly in an iterative process. Yet, if people appear so bad at making these decisions, we must ask what is actually guiding their decisions if we are to study individual choice. Since all collectives consist of individuals, it is the individual's thought process we are interested in examining to glean insights into aggregate trends and results.

One alternative to plain utility maximizing is that individuals are merely guessing at what will improve their lives (Campbell et al., 1960). If citizens are truly guessing randomly, however, distinguishing patterns from noise and theorizing about important variables individuals consider would be useless. Luckily, the literature is not so dim on individual choice. Social scientists, economists, and policymakers have long teased out consistencies and patterns from the unordered magic of individual action using empirical tests. Our project is within this tradition and is centered on revealing how quality of life matters to these political outcomes while our specific task is examining the relationship between ballot measure votes on taxation and quality of life.

Through all our work we focus on the individual and how a single person makes up his or her mind on political and social issues. It is evident that the average individual lacks important understanding of the issues they have opinions on, but use what they do know when making decisions (Popkin, 1991). Citizens equipped with opinions and preferences that they then use to establish their opinions on particular issues even if they lack information on that specific question.

Some authors believe that voters do not have information and are unlikely, and even unable, to go out and find that information before voting or answering questions on policy preferences (Converse, 1964). Individuals, according to this school of thought, provide opinions and confident responses regardless of their understanding of the vote or question at hand (Campbell et al., 1960). The evidence amassed by previous scholars is substantial and establishes that many conclusions are reached without information and has provided the underlying theory for why individuals would provide an answer even when they have virtually no actual knowledge on the subject.

All of the previous research is attempting to answer a specific question, how do individuals make decisions without all the necessary information or without any knowledge at all, in some cases? It is true many authors view individuals as essentially making random guesses, examining the full research makes it clear that such a proposition is far from the truth. While individuals certainly lack information,

sometimes vital pieces, they still have decision strategies to create answers and flesh out their opinions (Popkin, 1991). The more interesting question is how individuals use information they do have and what heuristics they may employ to simplify their decision-making process.

Zaller (1992) argued that individuals design their opinions from the knowledge they view as the most salient and have gleaned from their experiences. When presented with a question or challenge, individuals call on their existing stocks of information. Important factors are prior salience, heuristic value, and experience, among others. Individuals primarily use information that is most easily available, that is, at the forefront of their mind. In Zaller's conception, people do not merely guess or use minimal information, but have an extensive base of knowledge and use much of it in making decisions.

Others have adapted Zaller's model and noted that people use primarily heuristic devices. This allows individuals to avoid learning and storing all the information they encounter and that could potentially be useful in the future. Instead, individuals rely on and recall rules of thumb. This process is less intensive and so more likely to be used since individuals will find it less cognitively demanding (Kahneman, 2011).

Heuristics are obviously important, although there is some mixed evidence (Kuklinski & Quirk, 2001), they are a well-established aspect of fields like psychology, political behavior, and behavioral economics (Kahneman, 2011; Thaler & Sunstein, 2009). When heuristics are effective they cut through the noise and information to correct decisions, meaning the choice that maximizes utility. Voters can use information methodically and still with less effort than retaining the information demanded by Zaller's model (Lupia, 1994). The question then turns to which heuristics are effective at obtaining the right outcomes?

The literature points to two possible forms of effective heuristics. First, processes that individuals utilize to come to a solution (Lau & Redlawsk, 2006). Second, using cues to provide the necessary information (Goren, 2005; Rahn, 1993; Taber & Lodge, 2006).

Lau and Redlawsk propose some ways to section off different possible strategies individuals employ when voting or making other choices. Their first, memory, is not necessarily a heuristic, but is the base approach that the others modulate around and adjust in their applications. The use of memory is alternatively called rational choice decision-making and holds that individuals receive information about a topic, file it for later use, and then apply the information when relevant. This is a common model in political science literature and many ways of understanding voting rely on it (Fiorina, 1981). Its place as a common model, however, has also meant it is subjected to criticism on many fronts (Campbell et al., 1960; Converse, 1964) by those who think that voters know little about policies (Kahneman, 2011).

Research in psychology has uncovered many systemic problems with the use and application of memory to questions. Systemic problems are difficult because they will continually lead to predictably incorrect answers since the deviations from correct choices tend to be the same (Kahneman, 2011; Schacter, 1999). Preconceptions, for example, can lead to individuals incorrectly understanding the issue even as they serve as a kind of heuristic within memory. They are meant to improve

decision-making, but often bias the information individuals will accept and store for later use in their memory. People exclude information they disagree with or that does not fit the story they would like to tell themselves (Hansen et al., 2006).

Given the problems associated with memory, Lau and Redlawsk (1997) developed several other ways people may use memory and actually think about problems or questions they encounter. Their first system is called Early Socialization/ Cognitive Consistency. In this model, information that best comports with an individual's upbringing and the preconceptions it gave them is the easiest to use and used most effectively. Other literature has made similar proposals about how people think (Kahneman, 2011) and Converse (1964), Campbell et al. (1960), and Zaller (1992) all include similar ideas in their work. Goren's (2005) work on party identification, for example, is a real-world application of such a model. Political parties are an easy signal for use as a heuristic in decision-making.

The second possible theory Lau and Redlawsk detail is the "Fast and Frugal Decision-Making". In this conception, people presented with a question perform a narrow and regulated search for information that is relevant. This is the same point that Kahneman (2011), among others, makes in his work on behavioral economics, people have a general bias towards information that is the most recent and use their limited understanding from that information to judge the plausibility and usefulness of the information (Lodge et al., 1995).

Lau & Redlawsk's final proposal is bounded rationality, which is similar to Fast and Frugal Decision-Making, but holds that people are able to make rational decisions within certain frameworks and timelines. Long-term decisions, for example, are much more difficult for individuals to make because tradeoffs are unclear (Kahneman, 2011; Thaler & Sunstein, 2009). Bounded rationality can explain why people do make rational, utility maximizing decisions in many areas, but also fail to do so in other spheres.

These decision-making frameworks, the heuristics, present different ways of analyzing how individual voters actually determine who and what to vote for and if they should vote at all. Emotional appeals are a promising point to begin considering the role of heuristics in voting (Rahn, 2000). Anger and anxiety, for example, have been studied and Huddy, Feldman, and Cassese (2008) found that both emotions create different responses. Anxiety shuts down rational thinking and encourages the dependence and use of heuristics, but anger actually empowers and promotes the use of rational thought.

Another possible avenue for heuristics to play a role are those related to values. Elections are full of appeals to shared values and claims of representing those values while legislating. Voters have been found to rely heavily on their values as a heuristic to simplify decision-making (Feldman, 2003).

In the realm of politics, however, the most powerful heuristic may be motivated reasoning. Rather than revise their views when presented with contradictory evidence, individuals who are entrenched in a view will likely ignore it (Goren, 2005; Jost, Glaser, Kruglanski, & Sulloway, 2003; Rahn, 1993; Redlawsk, 2002; Taber & Lodge, 2006). Actively ignoring information is unlikely to assist in making good decisions and presents one of the more dangerous heuristics.

From this survey of literature, it is apparent that Converse's (1964) model that individuals are essentially randomly guessing, is not accurate. It is true, however, that individuals lack information and create heuristics to make it easier to manage and avoid the costs of maintaining and gaining relevant information. In cases where heuristics operate effectively, these are useful tools that streamline the decision-making process. Several of them, however, are open to manipulation and can result in negative outcomes and poor decisions if they are not checked (Kahneman, 2011; Thaler & Sunstein, 2009). Heuristics, after all, do simplify decisions by, sometimes screening out what may be important information.

Quality of Life as a Heuristic

The psychological theory of how quality of life may affect political outcomes suggests that individuals may use their quality of life as a heuristic. People have a general idea of their quality of life and may use that as a simple heuristic for evaluating policy changes, candidates, and ballot measures. In this chapter, we examine how people may treat a specific kind of ballot measure, those involving taxation, in the state of Washington.

A tax could obviously threaten the economic welfare of an individual and may then be voted down because of that, but a quality of life metric based on only economics is a poor measure of a multi-dimensional subject like well-being (Henderson, Lickerman, & Flynn, 2000). Individuals may be willing to make long-term tradeoffs with their life quality when faced when faced with questions of taxation. Though the risk aversion is clear in regard to ballot measures, there are ample heuristics that may conflict here. For example, an initiative to increase taxes that fund education may worry people and trigger their use of the risk aversion heuristic, but they may also have generally good feelings towards education or value education for its own sake. In such a situation, the outcome is not clear.

Our theory of utility maximizing quality of life choices has an easier solution to this question. It is simply a question as to the individual's opinion on the marginal benefit from more or higher quality education. Although there are problems with publicly funded education, it seems likely that there are still large returns to be had from education (even if we are beginning to experience diminishing returns).

Both of our theories of how individuals treat quality of life here predict that greater measured levels of well-being will be correlated with more votes for ballot measures proposing taxes and more of those measures passing. This follows in the footsteps of those researching social capital (Putnam, 2000). Generally, that literature argues higher social capital is bound together with more cooperation between citizens. We believe that individuals in high quality of life areas are more likely to support each such measures as they try to assist each other in accomplishing common goals. This hypothesis extends existing research on the subject (Yonk, 2013) that has found similar results to what we hypothesize and finds that, as we expect social capital and quality of life to be correlated, higher levels of social capital promotes turnout (Rahn, Brehm, & Carlson, 1999).

Direct Democracy and Quality of Life in Washington

Among the local policy questions that are most often left directly to the people at the ballot box are those measures that seek to raise taxes, a reality surely reflective of local politician's reticence to impose tax increases that may become problematic when it comes time to run for re-election. Washington State in particular has a long history of both the general use of direct democracy as a policy making tool and specially the use of direct democracy at the local level to decide tax initiatives. In fact, work done by the Initiative and Referendum Institute at the University of Southern California highlights that Washington was both an early adopter, 1912, and a prolific user of the initiative process ranking fourth among those states with the initiative power for the number of initiatives that appear on the ballot (League of Women Voters, 2002). Further Washington's rules for initiative and referenda use limit the ballot measure to a single legislative issue making their approach particularly well suited for analysis.

As Table 8.1 illustrates the range of quality of life scores for Washington State Counties is quite large ranging from a low of 0.106 in Pend Oreille County, a small rural county located in the far northwestern part of the state to a high of 0.409 in King County, which is the home of Seattle and wealthy suburbs which surround the metropolitan area. The average quality for the counties was 0.239 and there is substantial variation in the full range of county scores. These scores coupled with the presence of ballot measures for each county in the state during our test period makes Washington and ideal locale to test the relationship between quality of life and local ballot measures.

Tests, Data, and Results

We collect and summarize data on the number of county-level initiatives that increased taxes in Washington. The data were collected from Municipal Research and Services Center's database of local tax initiatives by county. The MRSC data base contained 333 local tax initiatives and ballot measures from 2013 to 2014. Our primary interest is the quality of life scores and the effect of each indicator on the votes for the initiative and whether or not it successfully passed the election. There are, however, other variables of interest to be considered, such as education level and crime rates. The full list of variables we include is in Table 8.2 below.

The quality of life measure and the indicator scores are derived from our index while the other measures are from various commonly available sources. Population data, education level, income, and demographic information are all retrieved from data sets provided by Census Bureau. Net Migration is from the Federal Reserve calculations of between county migration. Tax Measure for Public Safety, is a dichotomous variable that represents when the tax increase proposed to support

Table 8.1 Washington state counties. Quality of life scores 2010

County	Infrastructure	Economic development score	Education	Public safety score	Health	Quality of life score
Adams County	0.384	0.296	0.257	0.015	0.169	0.132
Asotin County	0.458	0.303	0.328	0.008	0.264	0.278
Benton County	0.410	0.375	0.319	0.008	0.292	0.304
Chelan County	0.408	0.345	0.335	0.016	0.290	0.298
Clallam County	0.397	0.323	0.257	0.012	0.318	0.245
Clark County	0.400	0.326	0.290	0.011	0.198	0.195
Columbia County	0.411	0.349	0.272	0.035	0.194	0.217
Cowlitz County	0.398	0.320	0.277	0.012	0.262	0.222
Douglas County	0.408	0.388	0.276	0.017	0.169	0.214
Ferry County	0.297	0.301	0.231	0.015	0.240	0.110
Franklin County	0.370	0.358	0.350	0.007	0.166	0.211
Garfield County	0.468	0.299	0.255	0.051	0.238	0.247
Grant County	0.364	0.278	0.285	0.012	0.267	0.184
Grays Harbor County	0.405	0.319	0.246	0.013	0.253	0.202
Island County	0.443	0.375	0.298	0.009	0.238	0.279
Jefferson County	0.419	0.354	0.372	0.018	0.262	0.317
King County	0.465	0.464	0.399	0.013	0.236	0.409
Kitsap County	0.428	0.369	0.305	0.011	0.266	0.289
Kittitas County	0.367	0.314	0.397	0.019	0.082	0.168
Klickitat County	0.412	0.314	0.268	0.019	0.253	0.220
Lewis County	0.336	0.344	0.265	0.014	0.163	0.132
Lincoln County	0.384	0.370	0.267	0.028	0.246	0.237
Mason County	0.350	0.380	0.247	0.016	0.226	0.191
Okanogan County	0.340	0.294	0.255	0.015	0.272	0.166
Pacific County	0.429	0.337	0.228	0.013	0.278	0.231
Pend Oreille County	0.271	0.363	0.177	0.025	0.244	0.106
Pierce County	0.437	0.387	0.291	0.016	0.231	0.278
San Juan County	0.376	0.368	0.334	0.026	0.365	0.344
Skagit County	0.407	0.381	0.266	0.012	0.295	0.278

(continued)

Table 8.1 (continued)

County	Infrastructure	Economic development score	Education	Public safety score	Health	Quality of life score
Skamania County	0.358	0.372	0.234	0.036	0.243	0.206
Snohomish County	0.404	0.428	0.306	0.011	0.148	0.238
Spokane County	0.433	0.326	0.314	0.012	0.243	0.259
Stevens County	0.373	0.346	0.276	0.011	0.269	0.226
Thurston County	0.414	0.389	0.319	0.009	0.262	0.297
Wahkiakum County	0.425	0.336	0.124	0.039	0.325	0.210
Walla Walla County	0.433	0.303	0.325	0.019	0.318	0.301
Whatcom County	0.404	0.335	0.371	0.011	0.310	0.321
Whitman County	0.406	0.291	0.486	0.009	0.267	0.337
Yakima County,	0.374	0.280	0.305	0.007	0.279	0.207

Table 8.2 List of variables considered

Quality of Life Score
Percent of the County with Bachelor's Degree
Percent of the County with High School Diploma
Per Capita Income
Unemployment Rate
Crime Rate
Median Age
Metro Area
Tax Measure for Public Safety
Percent Democrat
Average Household Size
Percent Female
Net Migration
Population
Percent Minority

Table 8.3 Logistic regression. Passage rates of taxation ballot measures. Observations 333, Pseudo R Squared 0.0921

Variable	Odds ratio	P value
Quality of Life Score	0.0876021	0.660
Percent Minority	0.0182332	0.403
Percent with Bachelor's Degree	1.034336	0.492
Percent with High School Diploma	0.9422662	0.473
Per Capita Income	1.000021	0.858
Unemployment Rate	0.9552498	0.757
Crime Rate	0.0004526	0.705
Median Age	0.9481828	0.509
Metro Area	1.423353	0.507
Public Safety Tax	2.904051	0.000***
Percent Democrat	1.001616	0.660
Average Household Size	0.3185031	0.648
Percent Female	0.5983815	0.059*
Net Migration	0.9999562	0.544
Constant	1.09e + 16	0.025**

*p < 0.10; **p < 0.05; ***p < 0.01

public safety programs and needs of the county, and includes all ballot measures on the topic of Fire, Criminal Justice, and Emergency Medical Services.

To test our hypothesis that higher quality of life will be positively related to the passage of local tax measures we use as our dependent variable each of the tax related ballot measures across the counties of interest coded as 1 when the ballot tax measure passed. In the alternative, it is also possible that residents with higher quality of life will be resistant to altering the status quo with increased taxes that may alter their life quality, and this reality becomes hour alternative hypothesis. It is further possible that there is no relationship between quality of life and local tax ballot measures, which is our null hypothesis.

In testing our hypothesis that the increased social capital associated with high quality of life scores will be correlated with a greater likelihood of ballot measures on taxation passing, we first employ a logistic regression. We begin with a logistic regression that quality of life and the ballot measure's passage and our control variables above and present the resulting odds ratio in Table 8.3.

Interestingly, this result shows that there is no relationship between the life quality of the Washington counties and the probability that the tax ballot measures pass, and we fail to reject our null hypothesis. It is also worth noting that few of the standard controls are similarly significant, only when the ballot measure is for a public safety tax increase being significantly related to the likelihood of passage with public safety taxes nearly three times as likely as others to pass. This is noteworthy since our earlier work with ballot measures suggested an inverse relationship between ballot measures and quality of life (although only some of the tests were statistically significant). From this first test, we can begin to suspect there is something different about taxing ballot measures at the local level from the forms of

Table 8.4 Regression. Yes votes on taxation ballot measures. Observations 333, R Squared 0.0932

Variable	Coefficient	P value
Quality of Life Score (100 point Scale)	−0.5679776	0.036**
Percent Minority	−0.3221109	0.989
Percent with Bachelor's Degree	0.357629	0.155
Percent with High School Diploma	−0.2273546	0.654
Per Capita Income	−0.0002641	0.686
Unemployment Rate	−7,018,982	0.450
Crime Rate	−1.439465	0.989
Median Age	−0.2321505	0.557
Metro Area	2.875558	0.290
Public Safety Tax	5.832427	0.000***
Percent Democrat	0.1325918	0.422
Average Household Size	−5.278641	0.648
Percent Female	−0.709355	0.584
Net Migration	−0.0008522	0.200
Constant	148.4868	0.085*

*p < 0.10; **p < 0.05; ***p < 0.01

ballot measures. We cannot, however, say much that is meaningful about the relationship between life quality and those ballot measure because of our failure to reject the null.

To discern further details about the relationship between quality of life and local tax ballot measures, we perform an analysis on the percentage of yes votes to evaluate whether quality of life may have in effect on the ballot measure in terms of the proportion of the population voting for the ballot measure. Further to aid in interpretation of our results we multiply our quality of life score by 100 so that a one point increase in that score can be directly related to increase in the Yes Percentage. We use this test in part because despite not being related to the passage of the measure it is similarly possible that the relationship exists in some meaningful form. The results of this test are included in Table 8.4 below.

The results here are more interesting as they provide some, although relatively weak, evidence for our alternate hypothesis. Our quality of life measure has a negative and significant coefficient indicated that as quality of life increases by one point on our adjusted 100 point scale the percent of yes votes on local tax measures in Washington counties decreases by just over half a percent, which given the results of our earlier analysis in Table 8.1 and the range of our quality of life scores is unlikely to be large enough to flip the outcome of the election.

The results of our two tests find no evidence for our hypothesis and relatively weak evidence for our alternate hypothesis. There is no significant relationship between the quality of life Score and the probability of yes outcomes on ballot tax measures, but there is a negative and significant relationship between the quality of life and the percentage that votes yes.

Implications

We demonstrate a weak relationship between quality of life and taxation ballot measures that also illustrates the multi-dimensional nature of quality of life. As a whole, our quality of life index is not correlated with increased passage of initiatives that involve taxation, but is related to a reduction in the percent of yes votes. Our results seem to show that individuals do consider quality of life as they consider how to vote, but not at a threshold to change election outcomes under this limited consideration.

The findings here conflict with some parts of earlier findings that quality of life was associated with increased votes for and increased passage rates of ballot measures (Yonk, 2013). There are, however, important differences. For example, previous work looked at the state-level and examined the overall rates of passage. This pooling of data shows a wider trend, but may obscure states who do not follow that tendency. Our results suggest earlier work should be examined to tease out finer relationships that may be obscured and reassess the specification of the models scholars have used to study direct democracy.

Chapter 9
Federal Spending and Quality of Life

The 2016 presidential election's campaign and result are interesting in part because of the societal cleavages they revealed. In particular, the differences it revealed in conceptions of *how* liberal democracies ought to function. Although all elections do this to some extent, Senator Sanders's campaign brought the question to the forefront of national dialogue. His thoughts about government's role in healthcare and breaking up economic power centralized in large banks while advocating for limiting the power of corporations rallied many to his camp, especially young voters. Sanders's position reveals a clear picture of government as a power for good. While his stance as a Democratic Socialist likely places him on the outskirts of this view, the heart of his position is not far from the main thrust of government's role. Social contract theorist Thomas Hobbes believed that without government life would be little but a short and nasty affair. That government is needed to bring out the saint and tame the brute and care for those in need is a common view (Finer, 1997). This theory of government is intertwined with the well-being of individuals. Government is, along with other important factors like consent, justified because it makes people better off.

In contrast to Senator Sanders, former president Ronald Reagan famously proclaimed that government is the problem and not the solution. Reagan's term was marked by attempts to roll back and deter the civil service and exactly the kinds of programs Senator Sanders championed. Where Sanders saw progress and hope, Reagan largely found regress and discouragement. Those galvanized by Reagan's political philosophy regularly point to the findings and scholarly works of public choice scholars who argue government is often coopted to serve private interests instead of the general welfare.

Public choice theory is often depicted as a glum and disheartened view of politics. In some ways, it may deserve that charge, the school of thought's primary insights are seeing politics as fundamentally about exchange and holding that self-interested individuals do not suddenly become altruistic upon taking public office. Fundamentally, public choice scholars look at politics as another kind of market, except the goods bought, traded, and sold are votes and political support. Politicians

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are assumed to desire and pursue reelection. Their main tactic for achieving their goal is in providing services to those that put them into power (Simmons, 2011).

It is, however, not necessarily true that politicians, while self-interested, do not care about their constituents beyond being reelected. Politicians are not most accurately characterized by slimy villains in smoke-filled rooms, but instead by bumbling but genuine do-gooders. It is simply that in the process of politics much of the gains must come at the cost of others. Since politics takes and redistributes, one area's gain means another's loss (Olson, 1965). This is, perhaps, the central difference between political markets and markets for goods and services in the view of public choice.

How Is Funding Distributed? To the Unfortunate or to the Well-Connected?

As theorists in this vein of affirmative public choice, we see not simply a fascinating philosophical debate about the purpose of government, but empirically testable claims in these two philosophies. If those in Sanders' camp have the correct view of government, that suggests two things about federal spending. First, more government funds will be allocated to those in need than those who are well-off already. This follows from the assumption that government's aim is helping those in need. Second, and more basically, government funds should increase quality of life. If Reagan's followers are right, however, we would expect that government funds will be directed towards those who already enjoy a high quality of life as those who are well connected or have the resources to lobby the government for help exploit their advantages.

One important overlap, between the two philosophies, they suggest mutually exclusive results only on the first of our hypotheses. No matter which opinion is held of government involvement in the economy, having federal dollars spent in your area is likely to improve your life. For the supporters of the high-minded view of politics, this is simply an obvious truth that the federal government can help small communities and improve their well-being.

Those more skeptical of government funding, however, may grant the starting point of the high-minded argument, but point out two factors. That receiving federal funds collected from others seems likely to improve the recipient's well-being, but it is also a textbook example of concentrated benefits and diffused costs. The argument is that by spreading out the costs of a policy across a large number of people, but directing the benefits to only a few, those who pay the price have only a small incentive to fight against the program. The payee's incentive is quickly exhausted, but those benefiting stand to lose much more and so they are willing to work harder to maintain their advantage. Concentrated benefits and dispersed costs is a common phenomenon that explains many political outcomes. It may also play a part in the relationship between quality of life and federal spending.

Methods and Data

The data for this chapter comes from several sources. Our primary interest, however, is in the federal expenditures each county receives. We examine the Federal Assistance Award Data System (FAADS) and the US Census for data on how much each county received in federal money. FAADS is commonly used in political science and shows where and how much federal money is spent once authorized in DC (Bickers & Stein, 1991; Lazarus & Reilly, 2010). FAADS is usually used in accordance with congressional districts, but our use of FAADS is adapted to look at each county instead. The second source of federal expenditure data is for 2010 and is less extensive. From it we calculate only the total amount of federal funds given to a county.

We employ our county quality of life scores and control for demographic factors using data are from the American Community Survey (ACS) or other Census programs and crime rate data from Uniform Crime Reports.

Tests and Results

Our test requires the use of two-stage least squares regression because our theoretical explanation depends on an endogenous relationship between quality of life and federal funds. Endogeneity is an econometric challenge where the causal mechanism is likely to involve two variables that are related and, in part at least, may cause each other. A simple example is university honors programs and their stellar student graduates. Is the honors programming the cause of the outstanding students? Or are already good students drawn to honors programs? It is likely that both are happening to some degree, but it complicates the statistical process of revealing the relationship between the two. The same idea holds here between federal spending and quality of life. In fact, simple statistical verification tests give strong evidence of this endogeneity (a Hausman test was significant at the 0.05 level). Two-stage least squares regression, as opposed to OLS, accounts for this two-way relationship and can be used to examine these cases.

Our first test examines the relationship between quality of life and federal funds by examining if more federal funds increases quality of life. For our 2005 test we use the FAADS data for 2004–2006 and we regress our quality of life index scores multiplied by 100 on federal expenditures and several control variables that will also affect the results and display the results in Table 9.1, and for our 2010 we track total federal dollars expended as reported by the US Census Bureau. Federal dollars is in thousands and the crime rate is the total of violent and property crimes in the county per 1000 people.

The findings in Table 9.1 show that quality of life is, as expected, associated with higher quality of life. An additional $1000 of federal funds in a county is associated with a 0.0001 increase in quality of life, a tiny, but potentially important change.

Table 9.1 Quality of life 2005 —G2SLS. Observations 9363. Groups 3

Variable	Coef	Robust standard error	P value
Federal Expenditures	0.0001	1.86e-06	0.000**
Population	−0.0001	0.0002	0.000**
Population Growth-Households	−0.0027	0.0004	0.000**
Local Government Revenue	1.00e-06	5.36e-07	0.062
Per Capita Income	0.00079	0.0003	0.012*
Percentage White	0.0836	0.0189	0.000**
Crime Rate	−0.1469	0.3075	0.633
Unemployment Rate	0.0023	0.0004	0.000**
Constant	15.141	1.625	0.000**

* p<.1, ** p<.05, *** p<.01

Table 9.2 Quality of life 2010 —G2SLS. Observations 3012. Groups 3

Variable	Coef	Robust standard error	P value
Federal Expenditures	0.0001	0.00003	0.117
Population	−0.0005	0.0003	0.118
Population Growth-Households	0.0051	0.0034	0.130
Local Government Revenue	1.96e-06	1.04e-06	0.061*
Per Capita Income	0.0004	0.0006	0.448
Percentage White	23.5174	19.0921	0.218
Crime Rate	−31.6171	132.4375	0.811
Unemployment Rate	0.6718	0.5353	0.210
Constant	15.141	1.625	0.890

* p<.1, ** p<.05, *** p<.01

We also test the same hypothesis using our 2010 data federal expenditure data. Here the same controls are employed, but we find no relationship and a generally bad model fit when attempting to replicate the 2005 results. Table 9.2 above shows the results of that test.

Using our 2010 data and index scores we find that federal expenditures are unrelated to quality of life in any statistically meaningful way. This may be the case for several reasons. Most obviously, using total funding may obscure any positives specific programs do and so even if some spending is helping people, it is being washed out by the other programs that do not perform as well. Second, government may be spending money in the wrong areas that do not matter to citizens' quality of life. Less likely but still possible is that the result is exactly right and federal spending does little for the residents of the area. This could leave most of the good done by government to the local level where officials have more information about the needs and desires of their citizens than federal bureaucrats and politicians. This explanation does fit with a strong reading of public choice theory informed by an understanding of concentrated benefits and dispersed costs. Our quality of life scores are aggregate measures of well-being. That means particular individuals in counties may benefit greatly from federal spending and that may simply not trickle down to others or there may be a net loss because of that federal spending.

Table 9.3 Federal expenditures 2005—G2SLS. Observations 9363. Groups 3

Variable	Coef	Robust standard error	P value
Quality of Life	1,391,133	384540.7	0.000**
Percent Democratic	−120378.7	36002.39	0.001**
Population	−0.3602	1.84	0.845
Population Growth-Households	523.95	113.98	0.000**
Local Government Revenue	−0.9515	0.329	0.004*
Per Capita Income	−224.49	66.86	0.001**
Percentage White	−41186.27	11203.31	0.000**

* p<.1, ** p<.05, *** p<.01

Table 9.4 Federal expenditures 2010—G2SLS. Observations 3012. Groups 3

Variable	Coef	Robust standard error	P value
Quality of Life	23778.14	11855.49	0.045**
Percent Democratic	−1409.539	2299.41	0.540
Population	10.0340	0.0564	0.000***
Population Growth-Households	−98.5691	10.2903	0.000**
Local Government Revenue	0.0392	0.0063	0.000***
Per Capita Income	−11.474	15.6800	0.464
Percentage White	−366650.1	155359.7	0.291

* p<.1, ** p<.05, *** p<.01

Our next set of tests examines the flipped relationship. Specifically, it explores who receives federal expenditures – those in need or those with high life quality. Table 9.3 includes the results which suggest that, contrary to the altruistic view of government, funding usually goes to those who are already doing well.

Tables 9.3 and 9.4 show that increases in federal expenditures are related to higher quality of life scores. This relationship exists even when controlling for party affiliation, population and its growth, local government spending, demographic factors, and income. Instead of federal funds going to those in need, it appears that those in high quality of life areas are better able to attract funds. That this is the case is not particularly surprising as those in high quality of life areas are likely to have higher incomes and be better educated, both of which are associated with increased ability to get federal funds. What is most interesting is that while federal expenditure have modest or no effect depending on the year of our index that is applied that higher quality of life counties attract greater funds is consistent across both years of our index.

Implications

Our results represent an empirical challenge for those holding to the altruistic theory of government's actions. Instead of helping those in need, federal funds appear to be primarily given to those who are already well-off. It is also unclear what

relationship federal expenditures have on quality of life. Federal funds have a positive effect in the earlier data, but not the more recent data from 2010. There are strong theoretical reasons to believe, however, that well-being is improved when federal funds are spent in that area.

The public choice theory, in contrast to the altruistic theory of government, seems to be confirmed by these tests. Federal funds are allocated through a political process and as such, those who are better at playing the game profit from their skill. Our earlier findings of links between voter turnout and quality of life may also be important here. If politicians are truly interested in being reelected, they may concentrate on handing out favors to those who will then turn up at the polls for them. Other research on quality of life and voters is also confirmed here because it appears that voters in high life quality areas are willing to vote to protect their current well-being (Yonk & Reilly, 2011).

The results provide no conclusive proof for either theory. If anything, our findings are both middling and muddled. Even though there is more evidence in favor of the public choice story (Olson 1965; Simmons, 2011), we propose that instead of being seen as confirmation of either theory, that the results be a bridge between the two ideas. For those lionized by Reagan's philosophy, remember that while federal spending in the aggregate seems to have little effect on well-being, each program should be analyzed on its own merits and may be a worthwhile expenditure. Further, it is unlikely that eliminating funding for such programs is likely and as such, these findings should push public choice advocates to suggest improvements that limit the harm and maximize the benefits of such initiatives. For those who found a political hero in the 2016 election, our results should be seen as a reason for skepticism about government spending. If seen this way, we think that the results can facilitate meaningful exchange and compromise in cutting wasteful programs and concentrating on what works.

We believe that the findings show a clear need for complementary theories of market failure and government failure to understand the world. Government appears to do much good for the world, but it is ill-suited for certain endeavors. In fact, our index finds a positive effect between quality of life and federal expenditures, but it is possible that just as we are missing the effect of programs that are helping people, we are also not capturing the negative effects of programs that are hurting people.

The obvious starting point for empirical work in this vein is in narrowing the focus of our tests to find relationships between well-being and other, smaller programs that may be more effective. Other scholars should also examine the local government spending and if there are differential effects when local governments distribute funds instead of a federal government. Local government officials may be more obviously accountable to their constituents and thus less prone to support failing programs. Of course, local government, since fewer people participate, may not be responding to the average person's interests, but instead those who show up to city meetings.

Chapter 10
Using Quality of Life in Public Policy

Every discussion of public policy could begin with a story, more illustrative than concrete, of a town plagued by rats. The rats, which had not been a problem at first, slowly evolved from nuisance to full vexation. The problem grew worse and worse as the rats broke into food stores and brought disease into the town. In an attempt to solve the problem, the city government offered a bounty for each rat tail brought to city hall. Soon people began bringing rat tails and walking out with their bounty. As the tails piled up, it seemed hard to doubt the program would soon solve the rat problem, but months went by with little improvement. The city's council met again to consider additional solutions and to consider the flaws in their previous plan. At their meeting one member brought out a cage of rats, one mother and several younger specimens. The reason for the bounty's failure, she explained, was simple. The reward had not prompted people to hunt rats, but to breed them instead.

This story, while perhaps a fanciful and hyperbolic example of unintended consequences, has parallels in actual public policy. For example, California provides a larger refund for recyclable materials than surrounding states. Those nearby have seen this as an opportunity for simple arbitrage – moving recyclables from states where they are valued at low levels and move them to areas where they are more desired. In response to this incentive, people have collected and recyclables, and then loaded semi-trucks full of recyclables in an attempt to smuggle them into California. The state now devotes some resources to policing this issue and has prevented smuggling that would have been worth as much or more than $10,000 (CalRecycle, 2017).

There is one central point to this discussion of unintended consequences: policy-making is difficult because it is nearly impossible to know how people will react. Intentions alone do not determine the outcomes of policy. Our book, however, is not principally about making policy. Instead, it is about the closely related field of evaluating policies and their effect on quality of life. Why, then, are we concerned about the unintended consequences of our quality of life index? Because setting up a standard, just as in the case of the rat tail bounty, creates an incentive to game that standard. As Costanza et al. (2014) assert, "[W]hat you measure is what you get."

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We know of no books or indexes, although we could be mistaken, that end with an appeal to be very cautious with their findings but let us be perhaps the first. The devoted reliance on our index, if devoid of the theory it rests on, will render our entire project moot. Our understanding of public choice suggests that the easiest way for a politician who sees his or her district is low in quality of life to attempt to merely boost the funding for several of the indicators. If they do more work, they may concentrate that funding on an indicator that is especially low in their county or state. As our index is robust and promising, it is possible such a course of action could improve not just that politician's county's score according to our index of quality of life, but actually help their constituents. A measure of a concept so multidimensional and contingent on individual desires as quality of life, however, should not be relied on so heavily. Our index is best used not as a control panel of levers to boost the well-being of individuals, but as a useful and rigorous thought experiment into what matters for well-being.

Even though they would improve the scores our index assigns, improving the lives of citizens is not as simple as increasing funding for police and fire departments, hiring additional teachers, or investing additional capital in a county. Because they are detached from the theory of individual choice and welfare undergirding our well-being index, these choices are unlikely to help the people politicians and policymakers aim to support. Such policies are more akin to doubling GDP by counting everything twice than increasing GDP by creating an environment that businesses can thrive in and fulfill the needs of their customers.

Our index is important because it provides a measure of success, but it is also dangerous for the same reason. It has the potential to be abused. There is a hidden tension in needing metrics like quality of life indexes to evaluate living standards and make improvements and the constant possibility of abuse by either enterprising politicians or the more likely bumbling do-gooders fumbling the proper use of them. Scholars of well-being must be cautious in their application of their insights or risk having them become moot. Quality of life is an essential part of a good life and it's obvious that legislators make improving their constituents' quality of life an aim in their work, but they may do so in effectively if the applications and driving causal theory are not clear to them.

In an ideal world, citizens would play the natural monitors of government actions and be able to keep its programs and size in check. Accountability would be provided through elections and other efforts. Such worlds have no need of metrics like our index. However, we are decidedly not in such a world. As such, the theory guiding our index brings us to broad suggestions about shaping policy.

Designing Public Policy to Promote Well-Being

Though it should be taken with caution and introspection about how it applies to each county, our index does provide insight into the proper role of government and policymaking. Politicians want to improve the lives of their citizens, even if our

investigation of federal expenditures suggests they are not good at it as a whole, and our work may suggest some paths forward. For example, our five indicators pulled from the existing quality of life literature, public safety, health, economic development, infrastructure, and education provide five solid starting points for consideration and improvement. It is not necessarily important to boost the specific components of each indicator, though in building the index we reviewed the relevant literature which suggests they are all important for well-being. Instead, these areas should serve as guides for analyzing counties where they may be lacking. A good life, one characterized by eudaimonia, is multidimensional and it seems unclear how, if one area is lacking, boosting the others could make up for the difference.

Politicians should carefully consider the role of government with regards to each indicator as well. Some indicators are more the purview of government than others. Government, after all, may simply not be suited for providing for the needs these indicators represent. Although public safety is an uncontroversial purpose of government, the other areas are more complicated. Public education and infrastructure are valuable, but their use should not be so heavy as to exclude private endeavors that will also benefit citizens. In our measure of education, for instance, we included non-public school options because there is good reason to believe they boost education quality by introducing competition. In cases like this, government action can stifle what would otherwise improve the well-being of its citizens. That private individuals, associations, and businesses also play a part in an individual's quality of life is important, but regularly overlooked in policy discussions.

In fact, one interesting area for extension of our index is investigating the role of these non-governmental actors in well-being. Churches, social clubs, and other private organizations likely play an important and powerful role in improving individuals lives both because of the work they do and merely providing a sense of cooperation and common vision.

An area where government plays a lesser role is in our economic development indicator. It is relatively free of components related to government services, though it does rely on the backdrop of the legal system and public safety covered in our first indicator. Despite being usually well-intentioned, the prospect of government failure presented in our discussion of federal spending and well-being should provide a caution to those who want to use government to help others. Often such endeavors leave those they meant to help worse off or help them only at the expense of others.

Markets, by contrast, are premised on expanding the total wealth in society rather than simply redistributing it. One person trades with another because they value what the other has more than what they are trading it for and so the size of the pie increases. Much of the prosperity of modern society can be traced back to such simple market exchange. Government almost always is involved in only moving existing portions around.

In this regard it is important to remember the debate between subjective means of estimating quality of life and objective measures. How an individual feels about their life is specific to that person. Our index cannot be used as a replacement for a sincere and significant investment in understanding what individuals want. It should

not be controversial that individuals know best what they want from their own life. Considering our own findings about government expenditures and well-being it is unlikely that government can make improvements in the quality of life of an area without actively serving the actual needs of individuals and not what legislators see as their perceived needs. As we have done in this book and recommend to all future scholars, policymaking must proceed with a focus on individuals and their incentives. This insight applies to both those who write the laws and those who work within the confines those laws create.

Future Frontiers in Quality of Life Studies

The index we develop is best used in explaining political outcomes, but it should not be limited to such applications. There are many further uses we foresee and likely even more that we cannot. For example, the role of private associations in well-being. There is certainly work to be done improving the index and updating the components of each indicator. The infrastructure indicator is in part based on the use of landlines for telephone service and limited internet access. In an age when these services are quickly being replaced by cell phones and broadband, latitude exists to better define and structure our indicators. This especially true given the interest in broadband access that is developing in academic literature and in public policy work (Townsend, Sathiasellan, Fairhurst, & Wallace, 2013; Sallet, 2017; Yonk & Simmons, 2014). In addition, our public safety indicator is based only on funding effort because of data availability, which makes it a promising avenue for expansion.

The interplay between our index and other indexes also appears to be a profitable enterprise. The Fraser Institute's Economic Freedom Index, for example, has been used to investigate many of the variables and factors that our well-being index includes and that are often used as simplistic proxies for well-being. Other state-level indexes of economic health or even physical health could be extended to the county-level and explored for relationships with quality of life. And, of course, the interest in income inequality as an important determinant of social phenomenon should prove to be a rich area for further scholarly work on life quality.

Perhaps primarily we are interested in examining the relationship between federal land policy and quality of life. The ideas that spurred the creation of this project are perhaps even more ripe for examination in the current political climate and concern over the fate of national monuments. It is also a compelling question because the theory is not obvious. It may be that protecting tracts of land through federal protections like national monument designations promotes tourism in the area and therefore improves the quality of life in the area and likely within the surrounding counties as well. It is also possible, however, that because of the restrictions that those protections entail lower on resource industries that the counties suffer the loss of both industry diversity or a general decrease in economic growth.

In the case of Utah's Bears Ears National Monument, for example, school trust lands used to fund public education were involved in the designation and the pro-

cess to move landownership around to allow the fund to continue operating is ongoing and has frustrated those involved with the trust lands (Trust Lands Administration, 2017a, 2017b; Fahys, 2017). The Utah School and Institutional Trust Lands Administration has been selling off private lands within the designated monument's area (Trust Lands Administration, 2017c), however, which may signal they believe the problems will be minor. If the monument interferes with educational funding for Utah, then it may negatively affect the well-being of counties within the entire state. Whether or not these costs are outweighed by the benefits is an important and fascinating research question. According to preliminary reports, President Trump's changes to Bears Ears lowered the captured school trust land acres from about 100,000 to only about 20,000.

There is likely to be a fascinating relationship between well-being of neighboring counties as well. Though there are good reasons to use the county borders, for instance a county's budget is spent within the county, there are also good reasons to examine the ways that those borders may not be useful divisions. Businesses don't care which county customers are from and so the quality of life of one area may appear artificially low if it relies on the resources in surrounding counties instead of having them within its own borders. Though we capture much of this leakage by including some components of the economic development score that examine if people travel outside of the county for work as well as net migration flows between counties, there is likely to be some uncaptured. Future research extending our index should explore the interplay between the life quality of adjacent and adjoining counties.

Future scholars of quality of life, for example, should also experiment with including measures for concepts such as free speech, autonomy, and other civil rights in well-being measures. These rights are vital for life quality, but our current model does not consider them. Other indexes include factors like civil liberties such as free expression and constitute an excellent starting point for how they affect well-being.

Our analysis leads us to the conclusion that limiting government to the essential elements and functions that other players in society cannot fulfill is most likely to promote the general well-being of counties. Pairing these limits with creating the proper institutions that individuals can work within will bring out the positives in both public and private spheres. Any reliance on our index should be paired with introspection and circumspect consideration of what the individuals whose lives will be affected actually need. Though our index is theoretically sound and statistically verified, it is unlikely to be perfect and, as we document in this chapter, likely excludes important factors of a good life.

Appendix: Calculating the Index

Education

The Education indicator is composed of three sub-indicators: funding effort, outcomes, and service availability. Taken together these indicators provide an understanding of education across counties. Follow the procedure below to calculate the education score:

The first sub indicator in education is Funding Effort; a Q score designates the scaled results. The primary interest is in the percent of the local budget devoted to education services, per capita educational payroll, and per pupil spending. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for funding effort, Table A.1 identifies the variables used to construct this sub-indicator and Table A.2 provides the specific order of operations used to score this sub-indicator.

The result of operation 8 is the funding effort score for each county.

The second sub-indicator in education is educational outcomes, a Q Score designates the scaled results. The primary interest is in the percentage of high school completers from 16 to 19, college enrollment, percent of total population with a high school diploma, percent of the total population with a college diploma, and the percentage of the population completing less than ninth grade. We then aggregated the scaled results for each of these areas and scaled the average to obtain a score for educational outcomes, Table A.3 identifies the variables used to construct this indicator and Table A.4 provides the specific order of operations used to score this sub-indicator.

The result of operation 18 is the educational outcomes score.

The final sub-indicator in education is service availability; a Q Score designates the scaled results. The primary interest is in the number of educational establishments per capita, and the availability of charter and magnet schools. We measure charter and magnet schools dichotomously with a value of 1 for counties with a charter or magnet school. We aggregated the scaled results for each of these areas

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Table A.1 Variables

Education Spending (Ed Spending)
Total County Budget
Education Payroll in USD (Ed Payroll in $)
County Population
Enrolled Students

Table A.2 Order of operations

Operation number	What the math represents	Mathematical operation
1	Percent Budget Ed	Ed Spending/Total County Budget (County Budget)
2	Percent Budget Ed Q	Scale Results (X-min) / (max-min)
3	Ed payroll per cap	Ed Payroll in $ / Population
4	Ed Payroll Q Score	Scale Results (X-min) / (max-min)
5	Per Pupil Spending	Ed Spending/Enrolled Students
6	Per Pupil Q	Scale Results (X-min) / (max-min)
	Percent Budget Ed Q	Result of Operation 2
	Ed Payroll Q Score	Result of Operation 4
	Per Pupil Q	Result of Operation 6
7	Funding Effort Score	(OP2+OP4+OP6) / 3
8	Funding Effort Scaled	Scale Results (X-min) / (max-min)

Table A.3 Variables needed

High School Completers
Persons 16–19 years 2000 (population used to calculate high school dropout rates)
Persons enrolled in College
Population
% Population with HS Diploma
% Population college Grad
Count of Population with less than 9th Grade
Total Population 25 years and older

and scaled the average to obtain a score for service availability, Table A.5 identifies the variables used to construct this indicator and Table A.6 provides the specific order of operations used to score this sub-indicator.

The result of operation 24 is the service availability score.

Using each of the sub indicators for education; funding effort, educational outcomes, and service availability, we averaged the scores for each county, and scaled the average to calculate the final education score (Table A.7).

The final education score is the value of operation 26.

Table A.4 Order of operations

Operation number	What the math represents	Mathematical operation
		High School Completers
		Persons 16–19 years 2000 (population used to calculate high school dropout rates)
9	High School Completion Rate	High School Completers / Persons 16–19 years old
10	HS Complete Q	Scale Results (X-min) / (max-min)
		Persons enrolled in College
		Population
11	College Enrollment	Persons Enrolled in College / Population
12	College Enroll Q	Scale Results (X-min) / (max-min)
		% Population with HS Diploma
13	Pop HS grad Q	Scale Results (X-min) / (max-min)
		% Population college Grad
14	Pop college Grad Q	Scale Results (X-min) / (max-min)
		Count of Population with less than 9th Grade
		Total Population 25 years +
15	% Pop Less than 9th Grade	Population with less than 9th Grade / Total Population 25 years +
16	Pop Less than 9th Q	Scale Results (X-min) / (max-min)
	HS Complete Q	Value of Operation 10
	College Enroll Q	Value of Operation 12
	Pop HS grad Q	Value of Operation 13
	Pop college Grad Q	Value of Operation 14
	Pop Less than 9th Q	Value of Operation 16
17	Ed Outcome	(OP10+OP12+OP13+OP14+OP16) / 5
18	Ed Out Come Scaled	Scale Results (X-min) / (max-min)

Table A.5 Service availability

Educational Establishments (Ed Establishments)
Population
Dichotomous NCES Presence of Magnet School
Dichotomous NCES Presence of Charter School

Table A.6 Order of operations

Operation number	What the math represents	Mathematical operation
		Ed Establishments
		Population
19	Per Cap Ed Establishments	Ed Establishments / Population
20	Ed Inst Entities Q	Scale Results (X-min) / (max-min)
	Magnet	NCES Presence of Magnet School
	Charter	NCES Presence of Charter School
21	School Choice	Magnet + Charter / 2
22	School Choice Q	Scale Results (X-min) / (max-min)
	Ed Inst Entities Q	Value of Operation 20
	School Choice	Value of Operation 22
23	Ed Avail	(OP20+OP22)/2
24	Scaled	Scale Results (X-min) / (max-min)

Table A.7 Final education score

Operation number	What the math represents	Mathematical operation
	Funding Effort Scaled	OP 8
	Ed Out Come Scaled	OP 18
	Service Availability Scaled	OP 24
25	Ed Score Average	(OP8+OP18+OP24)/3
26	Scaled	Scale Results (X-min) / (max-min)

Public Safety

The Public Safety indicator is composed of a single sub indicator, funding effort. This indicator provides an understanding of how public safety is provisioned across counties. This single indicator captures the relationship between the individual citizen and the purchase of public safety services. Following this procedure calculates the public safety score:

The only sub-indicator in public safety is funding effort; a Q Score designates the scaled results. The primary interest is in the expenditure per capita for both police and fire. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for funding effort. Table A.8 identifies the variables used to construct this indicator and Table A.9 provides the specific order of operations used to score this sub-indicator.

The result of operation 6 is both the sub-indicator score, and the final public safety score.

Table A.8 Variables needed

Expenditures for police protection FY 2002
Population per capita 2002
Expenditures for fire protection FY 2002

Table A.9 Order of operations

Operation number	What the math represents	Mathematical operation
		Expenditures for police protection
		Population per capita 2002
1	Police Expenditures per capita	Expenditures for police protection / Population
2	Police Expenditures per capita Q	Scale Results (X-min) / (max-min)
		Expenditures for fire protection
		Population per capita 2002
3	Fire Expenditures per capita	Expenditures for fire protection / Population
4	Fire Expenditures per capita Q	Scale Results (X-min) / (max-min)
	Police Expenditures per capita Q	Value of Operation 2
	Fire Expenditures per capita Q	Value of Operation 4
5	Funding Effort Score	(O2+O4)/2
6	Funding Effort Scaled	Scale Results (X-min) / (max-min)

Health

The health indicator is composed of three sub-indicators: service availability, funding effort, and rates of health insurance coverage. Taken together these indicators provide an understanding of education across counties. Follow this procedure to calculate the education score:

The first sub indicator in education is service availability; a Q Score designates the scaled results. The primary interest is in the number of physicians per 1000 residents, employment of non-physicians in health care. We have aggregated the scaled results for each of these areas and scaled the average to obtain a score for service availability. Table A.10 identifies the variables used to construct this indicator and Table A.11 provides the specific order of operations used to score this sub-indicator.

The result of operation 6 is the service availability score.

The second sub-indicator in health is funding effort on health-related activities; a Q Score designates the scaled results. The primary interest is in hospital spending per capita and payroll of health care workers, which capture both private and public

Table A.10 Variables needed

Number of physicians
Population
Number employed in health care

Table A.11 Order of operations

Operation number	What the math represents	Mathematical operation
	Number of physicians	
	Population	
1	Doctors Per 1000	Number of physicians / (Population * 1000)
2	Doctors per 1000 Scaled Score	Scale Results (X-min) / (max-min)
		Number employed in health care
		Population
3	Health care employees per capita	Number employed in health care / Population
4	Health care employment Q Score	Scale Results (X-min) / (max-min)
5	Service Availability Average	(OP2+OP4)/2
6	Service Avail Scaled Result	Scale Results (X-min) / (max-min)

Table A.12 Variables needed

Budget spent on hospitals
Population
Payroll of health care professionals

Table A.13 Order of operations

Operation number	What the math represents	Mathematical operation
		Budget spent on hospitals
		Population
7	Budget spent on hospitals / Population	Per capita health spending
8	Scale Results (X-min) / (max-min)	Scaled per capital spending
		Health care Payroll in $
		Population
9	Health care Payroll in $ / Population	Per capita health care payroll
10	Scale Results (X-min) / (max-min)	Scaled per capita health care payroll
11	(OP10+OP12)/2	Funding effort score
12	Scale Results (X-min) / (max-min)	Funding effort scaled score

Table A.14 Variables needed

Persons without health insurance

Table A.15 Order of operations

Operation number	Mathematical operation	What the math represents
		Percent without health insurance
13	100 – Percent without health insurance	Persons with health insurance
14	Scale Results (X-min) / (max-min)	Scaled insurance rate score

Table A.16 Final health score

Operation number	What the math represents	Mathematical operation
	Service Availability Score	OP 6
	Health Outcomes	OP 8
	Funding Efforts Score	OP 14
	Insurance Rate Score	OP 16
15	Ed Score Average	(OP6+OP8+OP14+OP16)/4
16	Scale Results (X-min) / (max-min)	Final Health Score

spending on health in each county. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for health funding effort. Table A.12 identifies the variables used to construct this indicator and Table A.13 provides the specific order of operations used to score this sub-indicator.

The result of operation 14 is the funding effort score.

The final sub-indicator in health is the rate of insurance coverage for each county. We calculated this rate using the reported number of persons without coverage, as a percentage of the overall population. We then scaled these results to achieve a score for insurance coverage. Table A.14 identifies the variables used to construct this indicator and Table A.15 provides the specific order of operations used to score this sub-indicator.

The result of operation 14 is the insurance rate score.

Using each of these sub-indicators for Health: Service Availability, Funding Effort, and Insurance Rate, we averaged the scores for each county, and scaled the average to calculate the final health score (Table A.16).

The final health score is the value of operation 16.

Economic Development

The economic development indicator is composed of three sub-indicators: service availability, outcomes, and funding effort. Taken together these indicators provide an understanding of Economic Development across counties. Follow this procedure below to calculate the economic development score:

Table A.17 Variables needed

Private nonfarm establishments
Resident population total (July 1 – estimate)
Average travel time to work for workers 16 years and over not working at home
Place of work – worked outside county of residence
Resident population (April 1 – complete count)
Private nonfarm establishments

Table A.18 Order of operations

Operation number	What the math represents	Mathematical operation
		Private nonfarm establishments
		Resident population total
1	Employers Per Capita	Private nonfarm establishments / Population
2	Employers Q Score	Scale Results (X-min) / (max-min)
		Average travel time to work
3	Commute Time Q Score	1-((X-min)/(max-min))
		Place of work – worked outside county of residence
		Population
4	Percent Out of County	LFE140200D/AGE010200D
5	Percent Out of County Q Score	Scale Results (X-min) / (max-min)
	Commute Time Q Score	Result of Operation 3
	Percent Out of County Q Score	Result of Operation 5
6	Travel for Employment	(OP3+OP5)/2
		Private nonfarm establishments (early year)
		Private nonfarm establishments (later year)
7	New Business	Private nonfarm establishments (later year) – Private nonfarm establishments (early year)
8	Business Entities 1 Year Change	Result of Operation 3 / Private nonfarm establishments (early year)
9	Business Entities 1 Year Change Q Score	Scale Results (X-min) / (max-min)
	Employers Q Score	Result of Operation 2
	Travel for Employment Q Score	Result of Operation 6
	Business Entities 1 Year Change Q Score	Result of Operation 9
10	Econ Service Availability Score	(OP2+OP6+OP5)/3
11	Scaled Econ Service Availability Score	Scale Results (X-min) / (max-min)

The first sub indicator in education is service availability; a Q Score designates the scaled results. We are primarily interested in the availability of employment and business opportunities within the county. The variables of interest include: total business establishments, travel time to work, location of place of work, and the change in total business establishments from the previous year (measuring new business growth). We aggregated the scaled results for each of these areas and scaled the average to obtain a score for service availability. Table A.17 identifies the variables used to construct this indicator and Table A.18 provides the specific order of operations used to score this sub-indicator.

The result of operation 11 is the econ service availability score.

The second sub-indicator in economic development is economic outcomes; a Q Score designates the scaled results. The primary interest is in per capita income, the unemployment rate, and the economic diversity of the county. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for economic outcomes. Table A.19 identifies the variables used to construct this indicator and Table A.20 provides the specific order of operations used to score this sub-indicator.

The result of operation 16 is the economic outcomes score.

The final sub-indicator in economic development is funding efforts towards economic development as measured by capital availability in each county. Using total bank deposits, total annual payroll, and total expenditures in manufacturing, we scaled these results to achieve a score for funding effort. Table A.21 identifies the variables used to construct this indicator and Table A.22 provides the specific order of operations used to score this sub-indicator.

The result of operation 24 is the funding effort score. Using each of these sub-indicators for economic development: funding effort, service availability, and

Table A.19 Variables needed

Per capita personal income
Civilian labor force unemployment rate
Diversity of Industrial Make up

Table A.20 Order of operations

	What the math represents	Mathematical operation
		Per capita personal income
12	Income Q Score	Scale Results (X-min) / (max-min)
		Civilian labor force unemployment rate
13	Employment Rate	100-X
14	Unemployment Q Score	Scale Results (X-min) / (max-min)
	Income Q Score	Result of Operation 8
	Unemployment Q Score	Result of Operation 10
	Diversity Q Score	Hachman Score
15	Economic Outcome Score	(OP8+OP10+*A2)/3
16	Scaled Outcome Score	Scale Results (X-min) / (max-min)

Table A.21 Variables needed

Commercial banks and savings institutions (FDIC-insured) – total deposits (June 30)
Population
Manufacturing: total (NAICS 31–33) – total expenditures
Private nonfarm annual payroll

Table A.22 Order of operations

Operation number	What the math represents	Mathematical operation
		Commercial banks and savings institutions – total deposits
		Population
17	Total Deposits Per Capita	Commercial banks and savings institutions – total deposits / Population
18	Total Deposits Per Capita Q Score	Scale Results (X-min) / (max-min)
		Manufacturing: total – total expenditures
		Private nonfarm annual payroll
19	Manufacturing Capital	Manufacturing: total – total expenditures / Private nonfarm annual payroll
20	Manufacturing Capital Q Score	Scale Results (X-min) / (max-min)
21	Payroll Per Capita	Private nonfarm annual payroll / Population
22	Payroll Per Capita Q Score	Scale Results (X-min) / (max-min)
	Total Deposits Per Capita Q Score	Result of Operation 17
	Manufacturing Capital Q Score	Result of Operation 20
	Payroll Per Capita Q Score	Result of Operation 22
23	Funding Effort Score	(OP17+OP20+OP22)/3
24	Scaled Funding Effort Score	Scale Results (X-min) / (max-min)

Table A.23 Final economic development score

Operation number	What the math represents	Mathematical operation
	Econ Service Availability Score	Result of Operation 11
	Economic Outcomes Score	Result of Operation 16
	Funding Effort Score	Result of Operation 24
25	Econ Development Score Average	(OP11+OP16+OP24)/3
26	Scaled Econ Development Score	Scale Results (X-min) / (max-min)

economic outcomes we averaged the scores for each county, and scaled the average to calculate the final economic development score (Table A.23).

The final economic development score is the value of operation 26.

Infrastructure

The indicator of infrastructure is composed of two sub-indicators: service availability, and funding effort. Taken together these indicators provide an understanding of infrastructure development across counties. The following procedure calculates the infrastructure score:

Table A.24 Variables needed

Public water supply: population served
Resident population total
Houses with heating utility service
Occupied housing units
Occupied houses with no telephone service available

Table A.25 Order of operations

Operation number	What the math represents	Mathematical operation
		Public water supply: population served
1	Convert Public water supply: population served to per capita	Public water supply: population served * 1000
		Population
2	Percent Grid Water	O1/ AGE040200D
3	Percent Grid Water Score Scaled	Scale Results (X-min) / (max-min)
		Houses with heating utility service
		Occupied housing units
4	Percent Occupied Houses on the Fuel Grid	Houses with heating utility service / Occupied housing units
5	Fuel Grid Score Scaled	Scale Results (X-min) / (max-min)
		Occupied houses with no telephone service available
		Occupied housing units
6	Percent Telephone Service	1 – (Occupied houses with no telephone service available / Occupied housing units)
7	Telephone Service Score Scaled	Scale Results (X-min) / (max-min)
	Percent Grid Water Score Scaled	Value of O3
	Fuel Grid Score Scaled	Value of O5
	Telephone Service Score Scaled	Value of O7
8	Infrastructure Service Availability Score	(O3+O5+O7)/3
9	Infrastructure Service Availability Scaled	Scale Results (X-min) / (max-min)

Table A.26 Variables needed

Local Government General Revenue
Land Area in Square Miles
Local Government General Revenue per capita
Direct Expenditures on Highways
Population used for Per Capita
Long-term Debt for Utilities

Table A.27 Order of operations

Operation number	What the math represents	Mathematical operation
		Local Government General Revenue
		Land Area in Square Miles
10	Income per sq. Mile	Local Government General Revenue / Land Area in Square Miles
11	Income per sq. Mile Scaled	Scale Results (X-min) / (max-min)
		Local Government General Revenue per capita
12	Revenue Per Capita Scaled	Scale Results (X-min) / (max-min)
		Direct Expenditures on Highways (Highway Expend)
		Population
13	Transportation Funding Per Capita	Highway Expend / Population
14	Transportation Funding Per Capita Scaled	Scale Results (X-min) / (max-min)
		Capital Debt
		Population used for per capita
15	Utility Debt Per Capita	Capital Debt / Population
16	Utility Debt Per Capita Scaled	Scale Results (X-min) / (max-min)
	Revenue Per Capita	Value of O12
	Income Per Sq Mile	Value of O11
17	Available Tax Revenue	(O11+O12)/2
18	Tax Revenue Scaled	Scale Results (X-min) / (max-min)
	Transportation Funding	Value of O13
	Utility Debt	Value of O16
19	Investment Score	(O13+O16)/2
	Tax Revenue	Value of O18
20	Outcome Funding Effort	(O18+O19)/2
21	Outcome Funding Effort Scaled	Scale Results (X-min) / (max-min)

Table A.28 Final infrastructure score

Operation number	What the math represents	Mathematical operation
	Outcome Funding Effort Scaled	Value of O21
	Infrastructure Service Availability Scaled	Value of O9
22	Infrastructure Score	(O21+O9)/2
23	Infrastructure Score Scaled	Scale Results (X-min) / (max-min)

The first sub-indicator in education is service availability; a Q Score designates the scaled results. The primary interest is in the percentage of households that have access to various types of utility services. The variables of interest include: population served by public water, households with grid fuel available for use, and telephone availability penetration. These measures capture both publically and privately provided infrastructure. We have aggregated the scaled results for each of these areas and scaled the average to obtain a score for service availability. Table A.24 identifies the variables used to construct this indicator and Table A.25 provides the specific order of operations used to score this sub-indicator.

The result of operation 9 is the service availability score.

The second sub-indicator in Infrastructure is funding effort; a Q Score designates the scaled results. The primary interest is in governmental revenues (a measure of funds available for use in infrastructure), direct expenditures on highways, and long-term debt for utilities of each county. We aggregated the scaled results for each of these areas and scaled the average to obtain a score for funding effort. Table A.26 identifies the variables used to construct this indicator and Table A.27 provides the specific order of operations used to score this sub-indicator.

The result of operation 21 is the outcomes score. Using both of the sub-indicators for funding effort and service availability we averaged the scores for each county and scaled the average to calculate the final infrastructure score (Table A.28).

The final infrastructure score is the value of operation 23.

Final Quality of Life Score

To calculate the final quality of life score we aggregated the scores for each of the indicators by averaging their scaled values, and scaled that average to obtain a final quality of life score that ranges from 0 to 1. This final score allows each county to be readily compared with any other county as it represents where the county falls in relation to the maximum and minimum observed values. The county with the lowest averaged score across the indicator receives a final score of 0, while the county with the highest average score receives a score of 1.

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