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Census Data

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Synonyms

Archival research; Public records

Definition

Data collected about an entire population, usually by national governments, to assist with state functions. When accessible by researchers, these large databases can be used to evaluate theories of human behavior internationally, over time, and inexpensively, in ways relatively uncompromised by sampling issues.

Introduction

Evolutionary psychology posits that behaviors result from complex, evolved adaptations, many of which are universal to a species (Tooby and Cosmides 2005). As such, it must contend with hypotheses across all levels of human society, from the individual to the species. Testing theories in such a way that can confirm the influence of adaptations across populations is by no means a simple task however. While the majority of studies are carefully designed and implemented upon subsets of a population, there are many rich secondary data sources that can be used to test complex evolutionary theories on a much larger strata of the population, as well as on national and international levels. Such sources are thus promising avenues to confirm or advance contemporary theory. In this chapter, the use of census data is critically discussed, and its use in contemporary literature is illustrated with some pertinent examples.

What Is Census Data and Why Is It Advantageous to Evolutionary Psychology?

Most national governments implement some form of national census every decade. While these are designed for assisting with state functions such as taxation, they nevertheless can be used fruitfully by researchers in the field. These massive data collections are often based on in-depth surveys that catalog the basic demographic characteristics of every household within a nation, detailing everything from the number and sex of household occupants, age, number of children, employment status, and size of dwelling are among just a few of the potential fields available. This provides a snapshot of the population at a given moment in history. While the majority of the basic demographic sections of the survey remain static over time, many governments also include other

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measures to help supplement future public policy which can also be of use to researchers. In recent years, two societal changes have enhanced the use of such data: public disclosure of census records and online availability (normally with tools to allow users to drill down to multiple levels of municipal administration). The ease of access to such data sets makes them an attractive option for use in research.

Census data has been in use for many years in many other disciplines (particularly sociology and criminology). Generally, however, it is used less in psychology, as its focus is predominantly (but by no means exclusively) on individual level behaviors and cognitions. Evolutionary psychology of course does not ignore these factors, quite the opposite in fact. Where evolutionary psychology differs, however, is in its underlying principles based on the evolutionary science of adaptations (Tooby and Cosmides 2005). One of the core criteria of demonstrating that a behavior or cognition is an adaptation is showing that it has consequences for fitness (the ability to leave descendants). This is where census level data is incredibly useful, as it can provide a wealth of accurate, objective information on actual offspring within families and many of the factors surrounding birth and mortality rates. While this may seem limited to a traditional human behavioral ecological approach to research (often referred to critically as "counting babies" – Nettle et al. 2013) the ability to examine population-level (and levels below where it allows) reproductive output provides a crucial window into human behavior.

The second core advantage to evolutionary psychologists is the ability to use this information to carefully compare across populations internationally. An additional criteria for showing evolved adaptations includes the principle of species level universality: if it is an evolutionarily ancient trait, everyone across cultures, nations, and geography should show evidence of it. Demonstrating invariance (or its absence) provides us with powerful information regarding the origin of a behavioral or cognitive trait. As mentioned earlier, most nations conduct a form of census that allows such a comparison to be made and on such numbers to allow us a greater confidence in conclusions emerging from such data. While the impetus to establish invariance, or lack thereof, in a given trait is of course not limited to evolutionary psychology per se (as all disciplines ideally consider cross-cultural variation to be important), its theoretical significance in the study of behavioral origins makes the quest for invariance of greater importance (and is alas examined all to infrequently).

The Methodological Advantages and Disadvantages of Census Data

Two of the core advantages to the use of census data have already been discussed, in that they allow us to tackle core evolutionary questions with powerful, large-scale, national, and international data sets. There are of course added advantages. First of all, many of these data sets are freely available to researchers and can be interrogated meaningfully with relative ease. Secondly, most countries conducting a national census do so on a repetitive timetable (every decade in the UK, e.g.). This opens up opportunities to meaningfully examine stability over time within (and potentially between) nations or other geographical demarcations. While not necessarily a longitudinal study by design, the insights this approach can provide are nonetheless important (Copping and Campbell 2015). Thirdly, the data sources are often rich enough with demographic information to allow us to transform and compute other evolutionarily significant variables of interest (actual and operational sex ratios, for instance). Variables such as these that are hard to consider without an actual figure or, at the very least, an accurate estimate of local male and female populations (stratified by age) are often difficult to obtain by other means. However, the ability to calculate such variables on a population level allows us to expand the range of evolutionary questions that can be considered. Fourthly, data that allows researchers to drill down into smaller geographical units can be used to act as indicators of the local environment that can be used as measure (if only a proxy measure) of local circumstances

for the purposes of modelling. This again can be informative for the purposes of testing theory, in particular, mid- or higher-level theories (such as life history theory). Finally, the use of such data allows us to partially mitigate the atomistic fallacy (where correlations on the individual level may not reflect the same relationships at higher-order group levels – Robinson 1950), something that can be hard to avoid when making conclusions and generalizations from smaller sample sizes.

There are of course limitations that one must be aware of when using such data; no method is after all perfect. While these data are valuable for study, they can be limiting in terms of the questions that we can answer from them. Unlike a study designed to test a specific theory or research question, census data is limited to the pool of items it has collected (or that which can be meaningfully expanded from it). This often means that researchers may have to rely on variables that do not fully examine the construct of interest or that proxies have to be used instead. Despite the power of the sample, this often means we cannot always be as confident in the findings as we would like (Copping and Campbell 2015). Comparisons over time and nations also posit some difficulties if the nature of the surveys change over time and place, as national agendas change frequently with different governments. Related to this is the challenge of readily combining data sets (from other public records, e.g.) within nations so that they provide a meaningful snapshot of the conditions of interest. This can be frustrating when some fields of interest may not have been collected at the same time, forcing researchers to make additional assumptions about their data. Finally, just as examining individuals leaves us open to the prospect of the atomistic fallacy, examining higher-order levels of data can lead us to make the ecological fallacy (Robinson 1950). Just because we see something happening at the level of various social stratifications doesn't mean the same effects are necessarily generalizable to the level of the individual. Related to this is also the danger of Simpson's paradox (Simpson 1951), where meaningful differences in populations can be masked if data is aggregated on higher levels. These problems of causal inferencing however are not limited to the use of census data, and responsible researchers need to be careful in how they interpret the data so as to not make inaccurate or misleading conclusions.

How Has Census Data Been Used to Advance the Evolutionary Sciences?

There are many pertinent examples of how census data has been used over the past decades to help answer important, evolutionarily derived questions. While these studies have some of the methodological shortcomings mentioned earlier, they are important attempts to exploit these valuable sources of data nonetheless.

One area of evolutionary psychology has benefited in particular: life history theory. Life history theory is a mid-level evolutionary theory that examines differential resource allocation across different environments and how potential trade-offs between investments can result in differential expression of various behaviors (such as aggression, early maturation, sexual precocity, etc.). Accounting for the wider environment, however, which is of course a critical stress-causing feature of daily life, is difficult to do objectively. Census data and public records however help us enormously to paint a picture of the ecological niches that modern man inhabits. An early example of how this can be achieved comes from Wilson and Daly (1997)who examined the impact of AU2 life expectancy and economic deprivation on homicide and early birthing rates. Using a combination of public health data and census data, they were able to compare 77 districts in the US city of Chicago, demonstrating that more affluent neighborhoods had higher life expectancies, which in turn had lower homicide and age-specific birth rates.

More recent work has taken these findings further. Copping et al. (2013) conducted a similar analysis using the UK census data (2001) and public records to analyze rates of criminality and teenage pregnancy across local authorities in England. They expanded the analysis to include more data that could encapsulate the environment in more detail and created a series of structural

models to evaluate theories surrounding how the environment impacts upon behavior from a life history perspective. This study broadly confirmed the analysis of Daly and Wilson and also posited a model of the factors that may have differing levels of impact in increasing violence and sexual precocity. While this large-scale analysis was interesting, its findings were limited by the ecological fallacy. In an attempt to mitigate this, Copping and Campbell (2015) followed up this work by comparing the same data from the 2001 census with the 2011 census. They found firstly that the original model was stable over the two capture points. Furthermore, they conducted a study using questionnaire data on the general public to capture similar variables to those recorded in the census. They also used postcode data from each participant to link the behavior of the individual to the local information captured in public records (in order to capture some of the wider ecological factors around each participant's home neighborhood). The findings of this study seemed to highlight a model that was very similar to the structural model created using census data only. While the two models were imperfect representations of each other, the obvious similarities between the two reinforced the conclusions of the original study and demonstrated how sources of data can be combined within research designs in novel ways to negate the ecological and atomistic fallacies.

Briefly alluded to earlier was the use of census data to calculate demographic characteristics such as sex ratios. Several theories suggest a key role for the impact of differing proportions of reproductively viable males and females, and census data provides an excellent opportunity to examine this in depth. For instance, previous research has suggested that a paucity of males can lead to elevated levels of localized violence, single-parent families, precocious sexual activity, and many other social phenomena. At the same time, a paucity of females has suggested much the same pattern. Combinations of census and public record data however seem to suggest that fewer males relative to females in the reproductive population (the operational sex ratio) is a key driver of aggression (Barber 2003; Messner and Sampson 1991) due to the instability it creates due to the lack of parental investment in offspring (as males are able to move more freely between sexual partners without having to make longer-term investments). This effect has been shown repeatedly across time periods and nations. This finding would have been difficult without readily available census data sets that accurately recorded population compositions at each point.

Future Directions and Conclusions

Evolutionary researchers need to begin exploiting these rich data sources more frequently to assist in answering pertinent research questions and to allow greater historical and cross-cultural trends to be examined. Such studies can greatly assist in answering questions regarding the universality of various behaviors. Furthermore, the use of this data can also paint pictures of various environmental settings. Cataloging local environments is a difficult task at the individual level and includes many different levels of objective and subjective perception (Nicotera 2007). Census data can at least provide some guidance on various environmental facets worthy of greater exploration. Furthermore, fruitfully combining public records with individually gathered data may also help establish the validity of many evolutionary theories while avoiding the pitfalls of the atomistic and ecological fallacies (Copping and Campbell 2015). While pertinent examples have been discussed here regarding the previous use of census data, much more can still be achieved if study designs incorporate this important source of information.

Cross-References

- Public Records
- Sources of Data in Evolutionary Psychology
- Surveys and Questionnaires

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