Classification of the Social Sciences

Rick Szostak

University of Alberta – Economics,
Tory Bldg 14103 53 Ave Edmonton Alberta T6H0S9 – Canada
rszostak@ualberta.ca

Rick Szostak is Professor Emeritus of Economics at the University of Alberta. He was President of ISKO from July 2018 to 2022. He is the author of twenty books and fifty journal articles in economics, history, interdisciplinary studies, information science, and several other fields. He has studied the theory and practice of interdisciplinarity for two decades and has emphasized in the last dozen years the ways in which knowledge organization systems might better facilitate interdisciplinary research and teaching. He has long argued that a phenomenon-based analytic-synthetic approach to classification is both feasible and desirable; he has more recently stressed the use of grammatical construction in performing that synthesis. He co-authored *Interdisciplinary Knowledge Organization* in 2016. He has created the *Basic Concepts Classification* (BCC), and is engaged in efforts to evaluate the BCC and compare it to other classification systems.

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Abstract This article discusses the nature of social science, emphasizing characteristics important to knowledge organization. It addresses the nature of social science disciplines, and compares social science to natural science and the humanities. It notes in particular that social science disciplines cannot be distinguished logically. It explores the treatment of the social sciences in both knowledge organization systems and the knowledge organization literature.

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1. Introduction

The purpose of this article is to outline the nature of the social sciences, with an emphasis on characteristics of particular import to the field of knowledge organization. We first discuss which disciplines are included within the social sciences (lists are provided in the Appendix). We subsequently examine the role that "social science" as a whole plays in the world. We then address the important question of whether social science disciplines reflect a logical division of the subject matter of social science. The subsequent section addresses the importance of interdisciplinarity, and especially the degree to which multiple disciplines address the same subject. We then compare social science to natural science, noting both important similarities and differences. The penultimate sections of the article address the connection between social science and knowledge organization. We first look at how leading knowledge organization systems treat the social sciences. We then look at how the literature of knowledge organization has addressed the social sciences. We close with some brief concluding remarks.

2. What are the social sciences?

We can attempt here both an intensive definition — trying to capture the essence of social science in a sentence or two — and an extensive definition: trying to list the various disciplines and interdisciplinary fields that are together thought to comprise the social sciences. Philosophers since the days of Ludwig Wittgenstein have warned us that humans are incapable of providing precise definitions in just a sentence or two. There are always ambiguities and caveats because concepts can only be fully appreciated within a web of related concepts. Wittgenstein himself recommended that we provide numerous examples of a concept in use. By providing an exhaustive listing of social science disciplines we thus clarify the meaning of social science.

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As the name suggests, the social sciences are those components of the scholarly enterprise that study[1] aspects of human societies and human relationships. They can be distinguished from the natural sciences that study various aspects of the natural environment. The boundary is perhaps inevitably fuzzy. Biologists who study animal societies are generally considered to be performing natural science. Yet psychologists often study animals (see below). The health sciences are also generally distinguished from the social sciences due to their emphasis on natural-science understandings of human health. As we shall see this leads to some debate regarding whether subjects such as nursing are best thought of as health science or social science. An even more challenging distinction is that between social science and the "humanities": we will see below that many scholars see this distinction as both arbitrary and unhelpful.

The largest disciplines in the social sciences are economics, political science, sociology, and anthropology (along with psychology). Geography is smaller, and not all universities offer coursework in geography (while others treat it as natural science)[2]. Likewise, linguistics is a separate small department at some but far from all universities[3]. In recent decades, a plethora of new "interdisciplines", often with the word *studies* in their title, have emerged: gender studies, a variety of area studies, ethnic studies, environmental studies, science and technology studies, peace studies, urban studies, media studies, future studies, and more. Inevitably, libraries that organize their collections around disciplines struggle to find appropriate places for the literature of dozens of new fields.

Psychology, for the most part, studies individual humans — though there are exceptions, such as the field of social psychology that studies human interactions. It is thus technically not a "social" science if we define social science as the study of social groupings or relationships, though many universities (including my own) group it with the social sciences administratively (note that much research in economics also focuses on individual decision-making). The somewhat lengthy *social and behavioral sciences* is often used to capture the social sciences plus psychology[4]. As noted above, many psychologists study animals (generally with the intent of drawing general lessons that might shed light on human behavior). These are sometimes thought to be doing natural science[5].

Though most economists and psychologists examine individual behaviors, the bulk of research in the social sciences examines social aggregates such as classes, ethnic groups, genders, or organizations. This huge body of research rests on an assumption that social aggregates play a role in the world that cannot be adequately understood by simply examining the behavior of individuals within these groups. This assumption has been questioned by "methodological individualists" who have argued that society is merely the aggregation of individual behaviors. Methodological individualism is a form of reductionism, a line of argument that we should strive to explain all activities in terms of the lowest level of organization. "Can the social sciences be reduced to psychology, which in turn reduces to biology?" (Risjord 2022, 10)[6]. It appears that the answer is no. At least at our present state of understanding we can identify causal roles played by social aggregates that cannot be reduced to understandings at the level of individuals.

Just as some methodological individualists had questioned the value of analysis at the level of social groups, some sociologists and anthropologists had doubted the value of individual-level analysis. Individuals were buffeted by cultural and social influences beyond their control. Yet Boero (2015, 1) likely captures the opinion of the vast bulk of both philosophers and social scientists: "The main assumption of this book is that individual behavior and social phenomena are somehow connected and that the investigation of that connection is central for all social sciences". If we accept that both individuals and social aggregates exert causal influences, then it makes sense to include psychology (and economics) within our understanding of social science. It also suggests that, as we shall find below, interdisciplinarity plays an important role in social science understanding.

The creation of art is a social activity and is studied by a minority of sociologists, anthropologists, economists, and psychologists. Yet much of the research on art within the academy is performed within the "humanities". The humanities prove harder to define in practice than social sciences. Some scholars emphasize the study of art (including literature) and cultural expressions such as folk dances. Others emphasize a methodological emphasis on the close reading of texts (including visual and musical texts). A third related distinction is that humanists emphasize interpretation (the meaning individuals attach to things) while social scientists stress causation. Yet many scholars would maintain that interpretation is really a form of causation (e.g. Buvke 2019)[7]. All three definitions exclude much of the research and teaching that actually occurs in the humanities — while many social scientists study art and cultural expressions, pursue close reading of texts, and engage in acts of interpretation. Some scholars, including Szostak (2023) view the fuzzy boundary between the social sciences and humanities as artificial and unnecessary (but see Gnoli 2018 for an alternative view). They worry in particular that it separates (most of) the study of art from the study of other aspects of human societies. The phrase *human sciences* is widely employed to signal the social sciences plus humanities. The abbreviation *SS&H* is also often applied to this combination.

History is treated in most universities as part of the humanities. Yet historians inevitably study economic, political, cultural, social, and psychological aspects of past societies.

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Many scholars, including the Gulbenkian Commission (Wallerstein 1996) and Szostak (2023) have thus stressed the important role that historians should play in fleshing out under what circumstances particular social science causal relationships are observed to occur.

> Both disciplinary areas [history and social science] originated, with the rise of the modern world, as a common enterprise to develop systematic, secular, and empirically validated knowledge about the historical-social reality. In this fundamental sense, history can be and should be seen as part of the social sciences or vice versa the social sciences as part of the historical sciences—both constituted by substantially inter-related modes of sociohistorical research. (Spohn 2001, 6829)

It is noteworthy that some historical research occurs within all social science disciplines. It is problematic that a historical work studying a particular relationship posited in social science will be classified and located quite differently depending on whether the author is located in a social science department or a history department (the Gulbenkian Commission had made a radical suggestion that historians be attached to social science departments).

Philosophy and religious studies are generally treated within the humanities, but are sometimes treated as social sciences (Wright 2015 treats them in his encyclopedia of social science, for example).

Finally yet importantly, some professional schools are generally considered to pursue applied social science understandings. The most common of these are in education, law[8], and business (note that law and education are often taught as social science courses outside of professional school settings, especially in Europe). Leading universal classifications such as the Dewey Decimal Classification, Universal Decimal Classification, and Library of Congress Classification group these professions with other social sciences. Some universities also have schools of social work. Many have schools of public policy (though political science departments often operate public policy programs). And of course there is library science, now more commonly styled information science and with a broader purview. Some other callings, such as speech therapy, rehabilitation, and physical education, combine social science and natural science[9].

In the Appendix to this article, we provide the full lists of fields covered in both the Social Sciences Citation Index (SSCI) and the *International Encyclopedia of the Social and Behavioral Sciences* (Wright 2015). Both of these sources naturally sought to be exhaustive in coverage, and they thus include subjects on the borders of social science[10]. They often include what might be considered subfields of the disciplines above (or perhaps interdisciplinary fields) such as neuroscience or archaeology. They both include some aspects of health: Wright has a chapter on health, while the SCCI speaks of "health & biomedical aspects of social sciences" and also includes nursing (both also include psychiatry). Both also include certain practices pursued in multiple social sciences such as statistics or biography. As noted above, Wright includes philosophy and religious studies.

3. The role of the concept of "social sciences"

Does it matter? What role does the concept of "social science" play in the world? The most obvious role is administrative. Many universities group social science departments together in a Faculty or College of social sciences. Smaller colleges that do not have enough economists or sociologists for discipline-based departments may have departments of social science. Yet, as we have seen above, the boundaries of such administrative units are not set in stone. Different universities may include psychology or history while others do not. While such decisions often have deep historical roots it is quite possible for disciplines to be moved in or out of a social science administrative unit during periods of administrative restructuring. Many universities have, for example, created administrative units for "cognitive sciences". We should also note that national and international statistical agencies often collect data relevant to all social sciences. And national and international granting agencies often operate at the level of the social (or human) sciences as a whole. As we saw above, some reference works, such as Wright (2015) or the SSCI, also address the social sciences as a whole, though we have seen that they define the boundaries of social science differently.

The individual disciplines comprising the social sciences thus have greater administrative coherence than the aggregate social sciences. They also tend to wield more power over the career paths of scholars: in most universities, it is disciplinary departments that operate PhD programs, hire professors, and play the greatest role in decisions about career progress[11]. Disciplinary identity is reinforced by the important fact that most academic conferences and journals (and the "lists" of book publishers) are disciplinary in nature — though interdisciplinary venues are increasingly common. Thus, Most social scientists have a stronger sense of identity with their own discipline than with "social science". (They may have a further identity with particular fields within a discipline, and strive to publish in that field's journals, but it is still the discipline that makes curricular and hiring decisions.) Though we will in this article worry about how best to classify the social sciences as a whole, we should not lose sight of the fact that scholars are often primarily interested in works from their own discipline (see Sugimoto and Weingart 2015 on the importance of disciplines)[12]. Yet there tends to be some shared sense of identity as social scientists. There are a small but significant number of journals and books that embrace the social sciences as a whole.

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As we shall see below, the field of knowledge organization has not devoted much analysis to the social sciences as a whole in recent decades. Domain analysis has often focused at the level of disciplines, while "universal" KOSs naturally embrace fields far beyond social science. Yet, in the 1970s and 1980s, there was much discussion of the common challenges that the social sciences posed for the field. We shall see that such challenges have not disappeared.

4. The structure of social science disciplines

The social science disciplines were not designed by an omniscient university administrator but rather reflect a complex historical evolution (see e.g. Wallerstein 1996; Szostak 2023). While speculation about the nature of human societies can be traced to at least the Greeks (Nisbet 2018), the idea of a separate field of "social science" appeared only in (revolutionary) France in the 1790s (Wittrock 2015, 485). Notably, Nisbet describes how leading figures in 19th century social science, including Comte, Spencer, and Marx, envisioned one unified social science: "Society is an indivisible thing, they would have argued; so, too, must be the study of society" (1989, 350). Nisbet (1989) goes on to describe how the dream of a unified social science gave way to the slow emergence of a set of social science disciplines[13].

Each social science discipline has its own history with one or a few founding figures, and the theories and methods that these advocated. These internal histories are only rarely situated within a broader understanding of how the subject matter of social science came to be divided up (Crothers 2015). One important exception is Backhouse and Fontaine (2014): while individual chapters explore particular disciplines (a reflection itself of the way historiography has focused on individual disciplines), the editors seek to identify the key similarities and differences in how these evolved (they stress an increased interest by the public and governments in social science after World War 2, and the waxing, waning, and waxing of cross-disciplinary connections since that war). Such comparisons did not concern the instigators of new disciplines: they sought to identify a congenial mix of theories, methods, and research questions. The field of political economy emerged in the nineteenth century and was later split into the present disciplines of economics and political science. The disciplines of sociology (study of society) and anthropology (study of humanity) emerged to take on a range of topics that neither economists nor political scientists emphasized. Geographers emphasized how human activities occur in space — with the boundaries of geography therefore somewhat vague for the simple reason that all social activity necessarily takes place in space. Each of these disciplines has taken on new questions while shedding earlier questions over time[14].

The result of this complex evolution is that anthropologists engage in two quite different activities: archaeological explorations of prehistorical societies, and detailed examination of the cultures of contemporary societies[15]. Sociology likewise comprises diverse topics: culture, social structure (the division of societies into subgroups of many types), demography, and criminology. These have no greater connection to each other than they do to the topics addressed by economists or political scientists.

Wallerstein (1996) discussed several ways in which the boundaries between social science disciplines were questioned in the second half of the Twentieth century. The division between history and other fields was doubted as scholars in other disciplines recognized the importance of a historical perspective. The monopoly of anthropologists in the study of non-Western societies was broken as economists, political scientists, and sociologists devoted some attention to the rest of the world (geographers had always had some interest in the wider world). There was an increased appreciation that economy, state, and civil society interacted and were thus not best studied in isolation. While appreciating the value of specialization, Wallerstein urged a complex systems approach to social science. He thus recommended that all university departments have some scholars with degrees from other disciplines.

We might have hoped that social science disciplines would coalesce around particular topics. Figure 1 shows how the social (human) sciences might be conceived as a set of interacting sets of phenomena. Unfortunately, there is no disciplinary home for the study of important topics: technology and science, human health, human interactions with the natural environment. These instead are studied in small pockets within multiple disciplines in most universities, though they are the focus of new (often underfunded) interdisciplines in others. Likewise, we have already seen above that both human culture (a set of beliefs and practices) and art are studied in multiple disciplines. Even social structure is now studied not just by sociologists but by numerous scholars in gender studies, ethnic studies, and elsewhere. Only in the study of economy and politics is it possible to identify an obvious disciplinary home where the majority of research and teaching about a particular topic occurs (see Szostak 2023).

This creates obvious challenges for researchers, students, instructors, and the librarians that seek to guide these to relevant work. Students curious about the economy can focus their attention on a limited set of subject headings, call numbers or shelves. Students interested in technology or health may find works of interest in various places[16].

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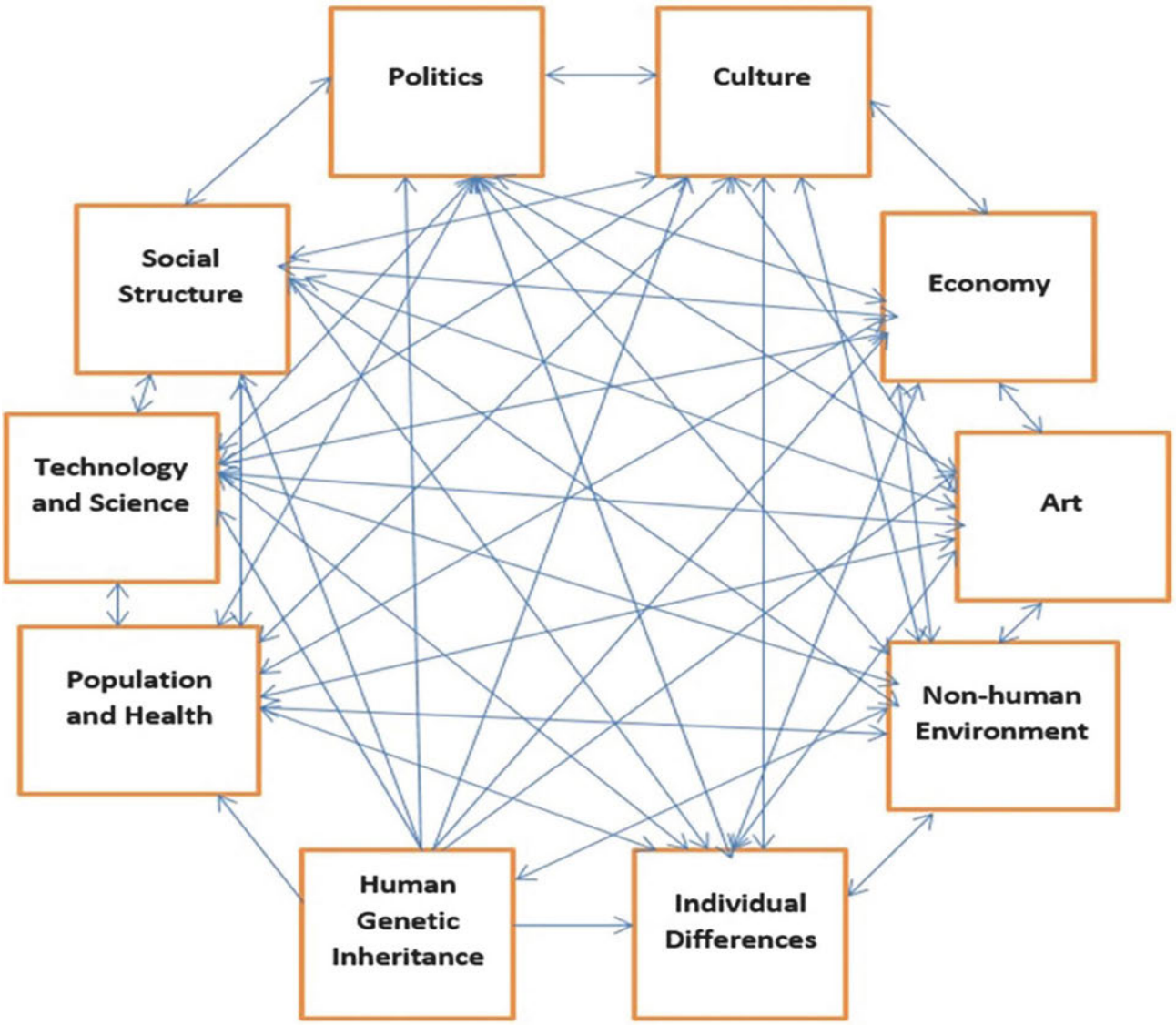

Figure 1: The social (human) sciences These categories of phenomena form the basis of the human science schedules in the Basic Concepts Classification. They were first identified using a combination of deduction and induction (devising a logical structure and then employing literary warrant to ensure a place for everything and have been fleshed out in detail since (Szostak 2004; 2021; 2023).

5. Interdisciplinarity and social science

Eykens et al. (2022) perform a bibliometric analysis of human science. Their aim was to measure the importance of interdisciplinarity. They find that for all topics addressed in human science, these are studied by scholars from many disciplines[17]. Only rarely did one discipline produce more than 40 percent of the literature on a particular topic. There were, of course, differences across disciplines, with economics being the most insular discipline, and sociology and linguistics being among the most open.

Why would this be the case? The illogic of social science disciplines (see above) is one important cause. As we have seen, many important topics have no clear disciplinary home, while others are viewed as core topics in multiple disciplines. A further factor at work is that the phenomena studied in human science all interact. A researcher seeking to understand, say, social structure, will naturally be curious about how politics, economy, culture, and many other phenomena influence (and are influenced by) social structure. Thus, even if social science disciplines had divided up the subject matter on a logical basis, there would still be much reason for scholars in one discipline to explore topics studied in other disciplines.

Börner (2010) traced citation activity across the entire scientific enterprise. She found that both the social sciences

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and humanities can be appreciated as distinct enterprises in that there are far more citations within these fields than there are to literatures beyond these fields. That is, social scientists primarily cite and are cited by other social scientists[18]. It is, of course, natural that specialized scholars will cite works in their own fields more than works in other fields. One can wonder about the effect of administrative divisions on citation behavior: if humanists were more often co-located with social scientists would they be more likely to cite each other?

The obvious implication for knowledge organization is that we should strive to facilitate user access to literatures in all social (human) science disciplines. Users will miss a great deal of relevant literature if they search only within one discipline. Yet most KOSs in widespread use in the world are organized by discipline, and tend to use different terminology and organizing structures for each discipline[19].

A less obvious implication is that users will often be most interested in the relationship between phenomena: how politics affects social structure, for example. We must ensure both that works are classified in terms of the multiple subjects they may address, and that it is easy to search for combinations of subjects[20].

6. The scientific status of social science

Are the social sciences really science? The answer to this question depends naturally on how one defines science. If one defines science narrowly as the performance of controlled experiments, then very little of social science would qualify. If, instead, one defines science as the careful application of theories and methods in order to understand the causal interactions among a set of phenomena, then (much of) social science surely qualifies[21]. Trends in the philosophy of science support the latter view. Cartwright and Moluschi (2014, 5) note that philosophy of science has moved away from the belief that there is one correct scientific method toward a belief that the essence of science is critical debate and careful analysis; social science is thus increasingly appreciated as a subject of philosophical examination[22]. The simple fact that social scientists employ a wide range of theories and methods means that scholars and others searching the social science literature will often be curious as to which theories and methods have been applied to a particular phenomenon or relationship, yet the KOSs in general use provide no help in answering such a query (Szostak et al. 2016 argue that phenomenon-based classifications could classify works by theory and method employed).

Though both social science and natural science are diverse endeavors[23], there is one important distinction between social science and most of natural science. Natural scientists can often isolate one or a small number of phenomena and carefully examine how they operate. They are often then able to identify precise and enduring relationships: force equals mass times acceleration, or these two chemicals will react in this way under these conditions of temperature and pressure. Social scientists are rarely if ever able to identify such "iron laws" for the simple reason that all social science phenomena interact. We may wish to understand how phenomena X and Y interact but are hindered in doing so because they interact also with dozens of other phenomena.

Social scientists are sometimes tempted to search for iron laws[24]. Yet the best we can aspire to do is statements of the sort "X affects Y in manner N but only if phenomena A, B, C... do not interfere". Note that such statements will often involve phenomena studied in multiple disciplines. The successful identification of such statements, then, requires interdisciplinary collaboration. Arguably, a classification system organized around phenomena and the relationships among these will serve the needs of social science far better than a classification system constructed rigidly around disciplines. The fact that social science disciplines are illogical (see above) further exacerbates the challenges associated with the latter approach[25].

The lack of "iron laws" in social science has led some to doubt whether social science is cumulative. Brittain (1979) doubted that social science was cumulative, and argued that information science would thus need to approach social sciences in a different manner from the natural sciences. Brittain based his argument on the fact that social scientists will often cite works from decades ago, a practice that is rarely seen in natural science. Foskett (1974, 7) turned the argument on its head, arguing that the fact that earlier writers are cited was a sign that their ideas were being built upon. Many other scholars would point to many advances in social scientific understanding[26]. Rather than focus on cumulation, a more useful distinction would involve the fact that many social sciences are characterized by a proliferation of theories. These rise and fall with some frequency (economics is yet again an outlier, though the dominance of rational choice theory has been weakened in recent decades by behavioral theorizing). Though some users may be interested in only their favorite theory, many users will wish to be guided to all relevant theoretical treatments of a particular topic[27].

One important difference in practice between social science and natural science is that replication is much rarer in the former than the latter — though here especially we should appreciate that there is much variation across disciplines within both social science and natural science (there may then be more replication in economics than computer science). In natural science, a research mistake or exaggeration (or fraud) will likely be exposed when other scientists attempt to replicate the research in question. In social science, researchers are often offended that others might at-

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tempt to replicate their research (Chambers 2017, 52-3). We can then only develop confidence in social science hypotheses as broadly similar pieces of research point in the same direction. It must then be easy for researchers to find research addressing similar topics[28].

One further distinction between social science and natural science is of particular importance to the field of knowledge organization. Key terminology is often vaguely defined in social science (with economics, as in many other ways, being more like natural science in providing fairly precise definitions of most key terminology). There are perhaps a thousand distinct definitions of *culture* in the literature, for example[29]. Yet authors writing about culture will not always indicate which of these myriad definitions they adopt. Some authors would define *culture* so broadly that it would subsume what others would call politics, economy or social structure (e.g. Hellemans 2017). Classifiers must then either work with vague and fuzzy classes or delve deeply into a work to identify more precise topics[30].

We might also note that the social sciences on average rely more heavily on books than is the case in natural science[31]. Major advances in natural science are almost always first reported in journal articles. In many but not all social sciences, books are more likely to be cited than are journal articles. This may reflect the complexity of social science: that most works analyze the interactions among several phenomena, often taking care to specify the background behaviors of several more. Yet again, there are important differences across social science disciplines — and economics is more like the natural sciences in relying on articles than other social sciences[32]. One result of this distinction is that citation indices in natural science can rely almost entirely on journal publications, whereas social scientists (and humanists) often complain that they are under-represented in citation indices because books are under-represented (social scientists in some fields are also somewhat more likely to publish in journals with a small circulation that citation indices may also miss). For knowledge organization, the implication is that users must be guided to books that will often have a complex subject matter[33].

Finally, we can appreciate that the subject matter of the social sciences is of interest far beyond the academy. As UNESCO noted in 1974, "Materials in the social sciences are needed by a much wider range of users. User groups include not only scientists but also administrators, policy makers, businessmen, social workers, lawyers, etc." (Hogeweg-de-Wart 1983, 152). We must thus be prepared to guide users who may have a limited familiarity with social science disciplines to the information that they seek.

7. Treatment of social science by KOSs

The Dewey Decimal System, though often revised through the years, still reflects the structure of scientific disciplines in the social sciences a century ago. Psychology is treated along with philosophy in the 100s (with the 150s devoted to psychology and the rest to philosophy)[34]. The (other) social sciences are addressed in the 300s. The numbers from 300 through 309 are devoted to general social science and then sociology and anthropology. The 310s address social statistics from various parts of the world. The 320s cover various fields in political science, and the 330s do the same for economics. The 340s cover law and the 350s cover public administration. The 360s are largely devoted to social work, but a couple of numbers deal with criminology. The 370s cover various types of education. The 380s are devoted to transport and communication, and the 390s to customs. The newer interdisciplines such as gender studies and ethnic studies and future studies have necessarily been squeezed into a classification system designed for the earlier social science disciplines.

The Universal Decimal Classification has its roots in the Dewey Decimal Classification. It likewise treats psychology with philosophy in the 100s, devotes the 320s to political science, 330s to economics, 340s to law, 350s to public administration, and 370s to education. It has, though, deviated in important ways. The 300- 309 range is largely devoted to general social science, but 305 is dedicated to gender studies. While most of the 310s are still devoted to statistics, room has been made for both demography and sociology. Cultural anthropology is treated in the 390s.

The Library of Congress Classification groups psychology with philosophy (and also religion): psychology is in BF while the rest of class B treats philosophy and religion. The social science class, H, treats general social science, economics, and sociology, with some related topics such as transport and communications. Political science gets its own class J, which also treats public administration. Law is treated in class K, and class L is devoted to Education. Class G addresses geography, anthropology and recreation. Linguistics is treated in class P, "language and literature". Gender studies is not treated as a distinct field, but most works would be classified within HQ, "Family, gender, and sexuality" (albeit with a limited set of subclasses).

The Bliss Classification divides up the social sciences somewhat differently. → Bliss had devoted considerable effort to identifying a logical set of broad divisions (which the later Classification Research Group would judge to reflect integrative levels): abstract sciences; natural sciences; physical sciences; biological sciences; anthropological sciences (physical anthropology, health science, medicine, psychology); social sciences; and technologies and arts. He then associated extant disciplines with these broad divisions (Bliss

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1929; 1953). Physical anthropology is thus grouped with human biology and health science in class H (thus mixing what others distinguish as social, natural, and health science). Psychology is associated with psychiatry in class I (again blending what others distinguish as social and health science). Class J treats education. Class K covers society (which includes social sciences, sociology and social anthropology). Social welfare and criminology are in class Q[35]. Political science and public administration are class R, while law is class S. Economics is class T. The Bliss classification does maintain separate classes for what are commonly viewed as the humanities: L for history (though with a subclass for archaeology), P for religion and ethics, W for arts, and X-Y for languages and literature.

The Colon Classification has a class A for general natural science as well as classes for specific natural science disciplines. It has no general social science class but does have classes for several social science disciplines: linguistics (P), psychology (S), education (T), geography (U), political science (W), economics (X), sociology (Y, with a subclass for social work), and law (Z). Note that linguistics is distinct from literature (O). There are separate classes for fine arts (N), religion (Q), philosopy (R), and history (V).

A phenomenon-based (as opposed to discipline-based) approach to classification treats the subject matter of the social sciences quite differently. The Basic Concepts Classification (Szostak n.d.) has seven schedules of social phenomena addressing in turn art (A), culture (C), economy (E), health and population (H), politics (P), social structure (S),and technology and science (T). It also has two schedules addressing individual-level phenomena, genetic predisposition (G) and individual differences (I). Similarly, the Integrative Levels Classification 2nd edition (http://www.isko.org/ilc/) has schedules for consciousness (p), language (q), rituals (r), communities (s), polities (t), enterprises (u), technologies (v), artifacts (w), artworks (x), and knowledge (y). These classifications serve to group together works on similar subjects regardless of discipline. Since they are synthetic (post- coordinated) they facilitate the identification of works that address how one phenomenon affects others. Since they are not grounded in disciplines, they do not privilege older disciplines at the expense of newer fields.

8. Treatment of social science in KO literature

There were a handful of book-length treatments connecting knowledge organization and the social sciences in the 1970s and 1980s (Foskett 1974; Lindsey 1978; Brittain 1970; Webb et al. 1986), but no book-length treatments since. A similar trend can be observed with respect to journal treatments: the journal *Social Science Information Studies* in 1986 (vol. 6, no 1) changed its title to International Journal of Information Management, and with this change in name, stopped covering LIS studies of social science disciplines. Though there are a small number of recent bibliometric studies of social science (e.g. Eykens et al. 2022), there has been little additional exploration of knowledge organization and social science[36]. It might be hoped that decreased interest reflects the fact that problems have been solved, but this is at best only partly true.

Foskett (1974) worried that the social sciences were not classified in as much detail as the natural sciences. Classes were too broad to be as useful as they could be[37]. He worried in particular that works were often given only one subject though they addressed many. He stressed that researchers were often interested in the relationships between different subjects: "By using a lattice type of classification a librarian can help a specialist to trace links from certain facets of his subject to subjects in other fields" (34-5). The librarian could thus counter a natural tendency toward over-specialization among researchers and "can act as a force toward integration and synthesis" (35).

Foskett was critical of existing library classifications. "One of the main criticisms directed against librarians by social scientists has been that the schemes found most widely do not, in fact, produce a helpful arrangement; very often they scatter material that needs to be used together, and infrequently they abolish subjects completely" (64). "Many librarians do not seem aware of the extent to which antiquated classification schemes damage the reputation of the profession". Foskett urged the development of new KOSs along with new principles. He noted that existing KOSs did not group subjects logically. He was especially critical of the fact that they did not facilitate the classification of works addressing relationships between subjects. He appreciated that UDC was far better at this than DDC, but still argued that a completely new scheme was necessary. He urged a system grounded in facet analysis but thought that the approach taken by the Colon Classification was unnecessarily complicated[38]. He hoped that the work of the Classification Research Group would lead to a KOS that far better served the needs of researchers.

The author briefly mentions Kyle (1958), an early and impressive attempt to develop a faceted approach to classifying social science. Kyle complained about the lack of clarity of much social science terminology. Kyle was also lauded in Grolier (1962), along with other attempts to develop a faceted classification. Ranganathan (1965) also commented on her approach.

Foskett also noted that researchers would often wish to know about which methods had been applied in a particular piece of research. He was critical of the suggestion that works be organized in terms of theoretical orientation; "we do no bad service if we provide an occasional reminder that different theories exist" (31).

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Lindsey (1978) explored the nature of social science journals. These do a bad job of discerning quality, and exhibit both confirmation bias and a bias based on the prestige of the author's university. As with most of the concerns raised by Foskett, these concerns remain to this day. Note that the problems identified by Lindsey are not unique to social science. They are of interest to KO to the extent that the field worries about the quality of information that users find.

Brittain (1970) reviewed social science user studies. He found that, even at that time, there were a very small number of user studies in the social sciences relative to those in science and technology studies. The few that did exist focused on psychology or education, and thus there was virtually no study of the information needs and practices of economists, political scientists, or sociologists. Brittain worried that the methodology of natural science user studies was imported into social science without any examination of the difference between the two. Such user studies necessarily told us little about the particular needs of social science researchers. He also worried that it was hard to evaluate user needs in the social sciences because little was known about the structure of social science literature (154). He argued that developments in the organization of libraries, and especially of information retrieval, should be guided by an understanding of user needs.

Webb et al. (1986) was the third and last edition of a book intended to help librarians build collections in the social sciences. It attempted for each main field in social science (and key subfields) to give an overview of the field and of key monographs and journals within the field. It covered history, economics, geography, political science, anthropology, sociology, psychology, and education. It also addressed several interdisciplinary theories or fields: functionalism, exchange theory, futures research, structuralism, conflict theory, and positivism. It surveyed various research tools such as bibliographies, and provided a guide to social statistics. Notably, there was extensive cross-referencing between chapters, to capture the fact that disciplines overlapped in their coverage.

Hobohm (1999) was stunned in being unable to find any research in the preceding decade on "social science information needs and behavior". He (like me) was at first sceptical of his own searching skills, but came to accept that there was in fact no literature to review. This shocked him precisely because research in earlier decades (especially Line 1971) had found that "social scientists do not use formal information tools like bibliographies or reference databases, but rather rely on personal recommendations, browsing in journals, and citations found in other publications" (Hobohm 1999, 122-3). This research further noted that they — with the notable exception of economists and psychologists — often cite literature from other disciplines, and thus "may not always find relevant resources in just one database or information system" (123).

As noted above, recent research has tended to be bibliometric in nature. Eykens et al. (2022) measure (what they call) interdisciplinarity in social science. Guns et al. (2018) explore cross-disciplinary publishing patterns. Harzing (2013) shows that social science articles are often mis-classified as "review articles" in the ISI *Web of Knowledge* simply because social scientists cite more authors than natural scientists. Kulczycki et al. (2008) and Narvaez-Berthelemot and Russell (2001) focus on cross-national differences in publication patterns.

9. Conclusion

This article has surveyed the nature of social science, and of social science disciplines. It has examined the scientific status of social science, and compared social science to natural science. It has explored the treatment of social science within both the KO literature and KOSs. It has devoted particular attention to the importance of interdisciplinarity within social science.

The illogic of social science disciplines, coupled with the fact that social science phenomena interact, create huge challenges for the field of knowledge organization. As Foskett (1974) noted decades ago, existing KOSs do not serve the needs of social science researchers as well as they might. Yet the particular challenges of classifying social science research have received limited attention in the KO literature in the last half century. I have suggested above that the best path forward involves (i) grounding a KOS in the phenomena that social scientists study rather than illogical disciplinary constructs; and (ii) facilitating the classification of interactions among all of these phenomena.

KO scholars might also usefully resume Foskett's task of identifying and measuring the ways in which existing KOSs disserve social science researchers (and others, such as policymakers, who need easy access to scholarly insights from any relevant discipline). We have identified several challenges above that merit further attention: social science classes are too large and vague; social science terminology is often vague; KOSs do not deal adequately with relationships among phenomena; many works address interactions among many phenomena; users often need to know which theories and methods have been applied; users often need to investigate a range of similar topics; and users need access to both books and articles (and more, such as government reports). We have noted in particular that user studies of social scientists (or policymakers accessing the social science literature) are exceedingly rare. Such efforts would both encourage and inform efforts to develop superior KOSs.

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Endnotes

1. We have purposely not attempted to clarify how this study proceeds since a wide range of methods and theories are applied in social science.
2. In the United Kingdom, among other places, physical geography is treated as a natural science, while human geography is treated as a social science. At my university, all geographers are in the (natural) Science Faculty, but the human geographers offer a Bachelor of Arts Major.
3. The study of language in general is often considered a social science in North America, though often treated in the humanities in Europe and elsewhere. The Organization for Economic Cooperation and Development treats the study of language as humanities within their R&D classification (Table 2.2 at https://www.oecd.org/innovation/frascati-manual-2015-9789264239012-en.htm). The study of individual languages is generally (paired with the study of cultural expressions and) pursued in the humanities.
4. Psychology is a newer discipline than economics or sociology. In its early days it was sometimes placed in natural science (since much psychological research is experimental and often performed on animals), and occasionally in the humanities or education. The German physiologist Wilhelm Wundt is often viewed as the first experimental psychologist: he established an experimental laboratory in Leipzig in 1879, but despite his interest in a natural science approach to the subject advocated for a cultural understanding. Psychology is sometimes still viewed as natural science. *The American Psychologist* in 1970 devoted a special issue (25, no. 5) to the place of psychology within the academy.
5. My university divides its psychology department: some professors are in the Faculty of Science, and others are in the Social Science division of the Faculty of Arts.
6. Risjord identified three key questions in philosophy of social science, each of which reflects one of the three central interests of philosophy itself. The key metaphysical question involves reductionism. The key epistemological question involves how the social sciences do and should differ from the natural sciences. The third question involves the role that values should and do play in social science research.
7. Bruner (1990, xi-xii) celebrates interpretation over causation: "To insist upon explanation in terms of "causes" simply bars us from trying to understand how human beings interpret their worlds and how we interpret their acts of interpretation". Yet he also would collapse the distinction between humanities and social sciences. Habermas (1990) urged the social sciences to pursue a hybrid approach that embraced both causation and interpretation.
8. A distinct discipline of "law" has existed for centuries in order to train lawyers. It thus long predates the other disciplines discussed here. Wallerstein (1996), among others, doubts its status as a social science because it relies primarily on the normative interpretation of legal texts. Yet there are currents within law, such as the field of "law and economics", which explicitly apply social science understandings to legal practice.
9. Hogeweg-de-Haart (1983) surveyed a variety of national and international classifications. There was almost unanimous agreement that economics, sociology, and law were social sciences. A large majority included political science and education. History was often included in national classifications but not in international classifications. Psychology was often included but also often excluded. The humanities tended to be treated as social sciences in France, Italy, and Eastern Europe but not elsewhere.
10. The Organization for Economic Cooperation and Development's R&D classification (Table 2.2 at https://www.oecd.org/innovation/frascati-manual-2015-9789264239012- en.htm), often used for reporting purposes, provides a much shorter list: psychology and cognitive science, economics and business, sociology, law, education, geography, political science, media and communications, and "other social science".
11. In my university, like many others, decisions regarding tenure and promotion are made at the faculty level, but department- level input tends to be decisive.
12. Most thesauri in social science are thus discipline- specific. Important exceptions include the multilingual UNESCO thesaurus (https://vocabularies.unesco.org/browser/thesaurus/en/?clang=en), developed by Jean Aitchison in 1977, and the HASSET Humanities and social sciences electronic thesaurus (https://hasset.ukdataservice.ac.uk/hasset/en/), used extensively in the United Kingdom in particular.
13. It is beyond the scope of this article to examine the reasons for specialization. We can note that natural science also became specialized into disciplines such as physics and chemistry at about the same time. Specialized research communities were better able to examine interactions among small sets of phenomena, but inevitably downplayed interactions with other phenomena. Szostak (2023) argues that a more logical division into disciplines was achieved in natural science.

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14. Wallerstein (1996) describes the history of social science disciplines; the largest of these became established as university departments and professional organizations (sponsoring journals) between 1850 and 1914, with geography and psychology solidifying somewhat later. These new disciplines were used to organize social science understandings by the enumerative library classifications being developed at the time.
15. Anthropology was distinguished from other social sciences in the beginning by its emphasis on non-Western societies (Wallerstein 1996).
16. It is in large part because of the illogic of social science disciplines that I was guided to develop the phenomenon-based Basic Concepts Classification. That classification not only allows us to treat subjects like health and culture in a coordinated manner, but aids us in appreciating how the various phenomena studied in social science influence each other. The schedules in the BCC are organized around logical and enduring categories such as social structure rather than illogical and evolving disciplines such as sociology. There are likely other general treatments in KO inspired by challenges in classifying social science.
17. This is, of course, not really a measure of interdisciplinarity, but it is useful for our purposes. Soós et al. (2018) suggest that interdisciplinarity is not more common in social science than natural science, though there is much variability across fields in both.
18. There are, though, important links beyond social science. Guns et al. (2018) find that only 59 percent of Flemish SS&H research is published in SS&H outlets. Philosophers often publish in natural science journals. Social scientists publish in health, computer science, and elsewhere.
19. The Integrative Levels Classification and Basic Concepts Classification instead are organized around phenomena rather than disciplines.
20. Smelser and Baltes (2001, xl; emphasis in original): "much important work done in the social and behavioral sciences cannot be subsumed conveniently under disciplinary headings. Many intellectual, social, and personal forces draw scientists outside their disciplinary boundaries. A decade ago Smelser co-chaired a national committee on basic research in these sciences for the National Research Council. Its charge was to identify leading edges of research in the relevant sciences for the coming decade. After spirited debate, that committee decided *not* to use the disciplines as organizing principles, but, rather, to shape its report around some 30 topical areas of active research and significant promise (for example, memory, crime and violence, markets, modernization), most of which were interdisciplinary (Gerstein et al. 1988)".
21. An alternative critique would be that social science is either impossible or illegitimate because of the nature of the subject matter. Hutchinson et al. (2008) argue that the best we can do is appreciate how people understand ther social behaviors; they are suspicious of attempts to theorize or generalize. Only a minority of philosophers, and fewer social scientists, accept this conclusion, though many might see important insights in their line of argument.
22. Academic disciplines can be seen as professions. Levine and Bell (2015) provide an overview of the professional development of social scientists from education through to employment in the United States.
23. Staveley et al. (1967) felt that distinctions between natural science, social science, and humanities were exaggerated, and celebrated (as this author does) the emergence of university programs that crossed such divisions. They critiqued how these divisions were instantiated in DDC, UDC, and LCC.
24. Wallerstein (1996) discussed how social scientists had often hoped but never succeeded in identifying the sorts of strong empirical regularities that were possible in some natural sciences. He appreciated that social science understandings had to be contextualized.
25. There are other (probably related) differences between social science and natural science. Natural sciences are more hierarchical: they have well-recognized hierarchies of journals and the top journals have very high impact factors (Andersen 2000). Economics is more hierarchical than other social sciences. Cartwright and Montuschi (2014, 1) note that philosophy of social science is less common and less respected than philosophy of natural science because in social science "concepts are vague, methods are in dispute, and there either is no theory on offer or far too many". Again, economics is more like natural science than are other social sciences.
26. Crothers (2015) provides an overview of the challenges in studying the history of any discipline. Most disciplines tell heroic tales of founding fathers. Elman et al. (2020), in their introduction, list a host of recent advances in social science methodology: machine learning, digitization, advances in experimentation, advances in causal modeling, GIS, and software for data analysis. They are still not sure that our understanding has advanced much, and they propose a set of reforms in social science practice to accelerate the rate of progress.
27. We should thus be wary of a theory-laden approach to classifying concepts (Szostak 2011). We should also be interested in classifying works not just by subject but by the theory applied and other aspects of authorial perspective (Szostak 2015).
28. Szostak (2023) argues that we can have the greatest confidence in a hypothesis when this is supported in mul-

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tiple studies employing different methods and datasets. Researchers need both to search across similar topics and the application of different methods.

29. Stjernfelt (2017) lists sixteen distinct broad definitions of culture (and many variations within), and appreciates that his list is not exhaustive.
30. This vagueness extends to some disciplines. Foskett (1974, 27), in noting that there is "far less agreement on definition" in social science, worries about "the many different definitions that have been given for 'sociology'". He hoped (28) "that we may look forward to an increasing tendency toward the general acceptance of a specialized social science vocabulary". This is far from being achieved a half century later.
31. Social scientists also need access to a variety of other types of information for their research: public opinion polls, government records, newspaper and magazine articles, various types of archival records such as personal correspondence, statistics of many types, and more. It would be a great boon to researchers if such information were classified by subject, but it rarely is.
32. There are also differences within disciplines. The author's original field of economic history emphasizes books to a much greater degree than other fields in economics. Hicks (2004) identified four different publication patterns across the social sciences, noting that quantitative evaluation of research output was much easier in fields (like much of economics) where publication patterns were more similar to the natural sciences.
33. Griffith and Small (1976) discuss the importance of books in social science. Sivertsen and Larsen (2012) argue that a book citation index for at least the major publishers is entirely feasible, and that this plus more international journal coverage could lead to a reasonably good citation index for SS&H. The major citation indices have been adding books to their coverage in recent years.
34. "[T]he treatment of Psychology in DC has a very curious history and at no time does it appear to me that the arrangement could have been helpful to psychologists" (Foskett 1974, 66).
35. The extended treatment of social welfare made the Bliss Classification popular with libraries in the voluntary sector.
36. There have also been some domain analyses of particular social science fields such as López-Huertas (2006).
37. "[W]e would not patronize a shop that kept all its screws in one box regardless of shape and size" (Foskett 1974, 2).
38. He urges the development of schedules of "things" and "processes", and suggests "in theory any subject might be classified by coding all the terms in each list and joining up the codes as necessary" (1974, 141). He then appreciates that these lists must be organized hierarchically. This is effectively the approach taken by the Basic Concepts Classification. Foskett urges the use of integrative levels as an organizing device as both BCC and ILC do. One challenge here is that there are myriad social phenomena at the same level of complexity.

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Appendix

It is not possible to provide a definitive list of social science disciplines, since new disciplines (or at least "interdisciplines") continue to emerge. Moreover, as noted above, there is debate as to whether various disciplines — psychology and history in particular — deserve to be treated as social sciences. We can, though, provide lists of disciplines (and subdisciplines and interdisciplines) that are often today treated as social sciences:

Social Sciences Citation Index (SSCI) "Web of Science Categories" (WC). On March 12, 2021

- Anthropology
- Area Studies
- Business
- Business, Finance
- Cultural Studies
- Communication
- Criminology & Penology
- Demography
- Development Studies
- Economics
- Education & Educational Research
- Education, Special
- Environmental Studies
- Ergonomics
- Ethics
- Ethnic Studies
- Family Studies
- Geography

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- Gerontology
- Green & Sustainable Science & Technology
- Health Policy & Services
- History
- History & Philosophy of Science
- History of Social Sciences
- Hospitality, Leisure, Sport & Tourism
- Industrial Relations & Labor
- Information Science & Library Science
- International Relations
- Law
- Linguistics
- Management
- Nursing
- Political Science
- Psychiatry
- Psychology, Applied
- Psychology, Biological
- Psychology, Clinical
- Psychology, Developmental
- Psychology, Educational
- Psychology, Experimental
- Psychology, Mathematical
- Psychology, Multidisciplinary
- Psychology, Psychoanalysis
- Psychology, Social
- Public Administration
- Public, Environmental & Occupational Health
- Regional & Urban Planning
- Rehabilitation
- Social Issues
- Social Sciences, Biomedical
- Social Sciences, Interdisciplinary
- Social Sciences, Mathematical Methods
- Social Work
- Sociology
- Substance Abuse
- Transportation
- Urban Studies
- Women's Studies

Subject classification in the *International Encyclopedia of the Social and Behavioral Sciences* (Wright 2015)

- Anthropology
- Applied Social and Behavioral Sciences
- Applied, Industrial, and Organizational Psychology
- Archaeology
- Area, Development and International Studies
- Behavioral Neuroscience
- Biographies
- Clinical Psychology
- Cognitive Neuroscience
- Cognitive Psychology
- Contemporary Cultural Concerns
- Criminology
- Culture and the Arts
- Demography
- Developmental Psychology
- Economics
- Education
- Environmental and Ecological Sciences
- Ethics of Research
- Evolutionary Sciences
- Gay, Lesbian, Bisexual and Trans-sexual
- Genetics, Behavior, History and Society
- Geography
- Health
- History
- History of the Social and Behavioral Sciences
- Institutions and Infrastructure of Social and Behavioral Sciences
- Labor Studies
- Law
- Linguistics A
- Linguistics: B
- Logic of Inquiry and Research Design
- Management, Organizations, Business, Marketing and Finance
- Mathematics and Computer Sciences Applications
- Media Studies and Mass Communication
- Memory: Cognitive and Neuroscientific Aspects
- Motivational Psychology
- Neuroscience of Language
- Personality Psychology
- Philosophy
- Political Science
- Psychiatry
- Public Policy
- Religious Studies
- Science and Technology Studies
- Sexuality
- Social Psychology
- Social Work
- Sociology
- Statistics
- Studies of the Life Course
- Urban Studies and Planning
- War, Peace, Violence and Conflict

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