

# Researching Humans: A Guide for Aspiring Behavioral Scientists

By Elise Mowbray

	page
Chapter 1: The Behavioral Sciences.....	1
Chapter 2: Anthropology.....	3
Chapter 3: Criminology.....	7
Chapter 4: Economics.....	9
Chapter 5: Neuroscience/Cognitive Science.....	13
Chapter 6: Psychology.....	16
Chapter 7: Sociology.....	19
Chapter 8: Researching with Human Subjects.....	22
Chapter 9: Writing Behavioral Sciences Research Reports.....	29
Chapter 10: Behavioral Sciences Undergraduate Programs for Aspiring Researchers.....	34



This guidebook is for students interested in the unique demands of researching human behavior and conducting studies involving human test subjects. I wrote it in support of the mission of Research to Empower, a global nonprofit focused on inspiring, supporting, and empowering aspiring researchers. We make research fun and accessible to all, regardless of age, gender, race, and financial background.

I heartily suggest students who are unfamiliar with research in general to read [Research to Empower: A Vibrant Guidebook for Young Students](#). Written by our organization founder Grace Liu, *Research to Empower* provides step-by-step guidance that empowers young students to conduct excellent research.

I also welcome you to visit Research to Empower's website at [www.research2empower.org](http://www.research2empower.org). There, you will find more tips on student research, a section focused on the behavioral sciences, a behavioral sciences monthly newsletter you can sign up to receive, and access to free training for aspiring researchers.

Warmly,  
Elise Mowbray  
Director of Publications and Research Knowledge Curator  
Research to Empower

# Chapter 1. The Behavioral Sciences

**Phenomena:** Enduring aspects of human existence that can be explained through research<sup>11</sup>

Welcome, student researchers! This guidebook is for curious minds interested in examining human behavior. When that examination is done systematically, students can contribute insight to a field of science that is complex, challenging, and tremendously significant.

The behavioral sciences seek to explain phenomena through scientific methods. This involves examining people individually and in groups, operating in varying contexts and constraints. Researchers tackle challenging topics such as conscious thoughts, motivation, social influences, and the rational/irrational choices humans make while trying to account for beliefs and attitudes<sup>1</sup>. The National Institutes of Health (NIH) defines the behavioral sciences as the study of the complex interplay between behavior and biological, social, and environmental processes, including phenomena that occur within a person (e.g., genetics, neurobiology, emotion, perception, and cognition) and externally (e.g., environment, social relationships, societal factors, culture, and policy)<sup>2</sup>.

Clearly, subject matter for behavioral sciences research can vary greatly, from irrational interactions with the stock market to genetic predilections for internet addiction to incentivizing lawful behavior. Behavioral sciences research can also inform all aspects of health care. From the individual patient's perspective, research can inform treatment and decision-making through psychology, neuroscience, and cognitive science<sup>3</sup>. From a collective perspective, research can inform our understanding and shaping of interpersonal, group, and societal behavior, including sociology, economics, and anthropology. In fact, behavioral sciences research can help identify key factors that underlie all complex health problems besetting our society<sup>4</sup>. The NIH reports:

*Psychological, social, and cultural studies pertain to virtually everything that people treat as a problem in our civilization—violence, theft, pollution, and illness—and nearly everything hailed as a triumph—justice, plenitude, artistry, and freedom. Even in events that are nominally quite technical in character, such as the eradication of polio or the explosion of the space shuttle, human factors, behavioral and organizational, play a large role<sup>5</sup>.*

Behavioral scientists take on special demands as researchers, given that scientific validity has long been a point of contention within this field. Topics can involve a multitude of variables that cannot be controlled. Research often involves qualitative data (which can be trickier than quantitative data to capture and analyze), ethical concerns, and confirmatory testing for conditions that can be nearly impossible to perfectly replicate<sup>6</sup>. It can be difficult to entirely separate findings from a discipline's assumptions and researchers' own values and experiences<sup>7</sup>. Human nature is extraordinarily complex. And human behavior—even as study phenomena—does not exist in a vacuum.

## Growth of Behavioral Sciences Research

The behavioral sciences gained prominence during World War II, when nations began to mobilize researchers to train soldiers, manage a wartime economy, thwart their enemies, and prepare for reconstruction<sup>8</sup>. The field got an additional boost in the 1950s and 1960s in the United States when the federal government increased funding for basic and applied research in the behavioral sciences among universities, research institutes, and its own agencies<sup>9</sup>. This was due to a surging interest in designing and implementing science-backed public policies<sup>10</sup>.

Remarkable growth has continued in the 21<sup>st</sup> century as research approaches have matured for producing evidence in discipline-specific terms<sup>11</sup>. Attention has turned to decision-making frameworks and cognitive biases as researchers explore the role of

<sup>1</sup> <https://www.chicagobooth.edu/mindworks/what-is-behavioral-science-research#:~:text=Behavioral%20science%20describes%20the%20study,of%20systematic%20experimentation%20and%20observation>

<sup>2</sup> <https://obssr.od.nih.gov/about/bssr-definition>.

Note: This guidebook has a U.S.-centric focus on resources and universities, which simply reflects where the author lives. But research in these disciplines thrives on a global level, with expertise and credible sources to be found on every continent.

<sup>3</sup> <https://www.ncbi.nlm.nih.gov/books/NBK22624/>

<sup>4</sup> <https://www.ncbi.nlm.nih.gov/books/NBK22624/>

<sup>5</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546488/>

<sup>6</sup> <https://bidenwhitehouse.archives.gov/ostp/news-updates/2024/05/15/blueprint-for-the-use-of-social-and-behavioral-science-to-advance-evidence-based-policy-making/>

<sup>7</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>8</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546488/>

<sup>9</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546488/>

<sup>10</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC5293198/>

<sup>11</sup> <https://www.nature.com/articles/s41562-023-01555-3#:~:text=There%20has%20been%20%E2%80%9Ca%20remarkable,place%20over%20many%20preceding%20decade>

intuitive and unconscious thinking along with more reflective and self-aware cognitive processes<sup>12</sup>. Mental health research in particular has become a wide-reaching concern. In its publication *Advancing the Nation's Health Needs*, the NIH stated how behavioral sciences research provides critical insight with far-reaching implications<sup>13</sup>:

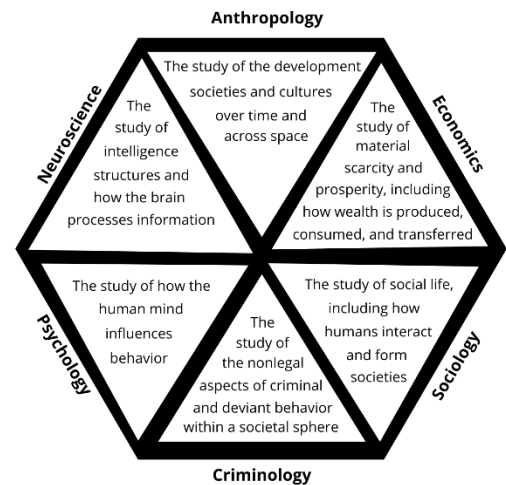
*It is now accepted that many diseases, historically considered mainly a matter for biomedical research, such as heart and lung disease, drug addiction, tuberculosis, and malaria, cannot be understood and treated without the benefit of behavioral and social research. When these far-reaching health implications of behavioral, social, and economic factors are added to the more direct implications of research for mental illnesses such as depression, schizophrenia, and various neurological illnesses, it is no surprise that the research demand in the behavioral and social sciences has grown rapidly in recent years.*

## Behavioral Science Disciplines

**Epistemology:** The established knowledge providing context for an area of research.

In the mid-1900s, some researchers identified themselves generally as *behavioral scientists*, holding an elite rank within the social sciences<sup>14</sup>. But as the study of behavior matured into myriad distinct concerns<sup>15</sup>, research and academic study mostly organized into the following six core disciplines of the behavioral sciences:

1. **Anthropology**
2. **Criminology**
3. **Economics**
4. **Neuroscience/Cognitive science**
5. **Psychology**
6. **Sociology**



Today, these distinct academic fields can sometimes even sit in separate colleges, with research published on both cross-disciplinary and highly specialized topics. Consider some of the most well-known overlapping concerns:

- the separate schools of criminology and law,
- the shared focus between the schools of economics and business on how profit is generated,
- the shared focus of between the schools of cognitive science and computer science on structures for computation and analysis,
- neuroscience (as a study of the nervous system) and neurobiology (focusing on the brain's biological mechanisms),
- psychology and psychiatry's different approaches to the shared focus on mental health, and
- sociology (looking at the impact of a broad swath of institutions) and political science (looking at the impact of government).

Each of the aforementioned disciplines can approach a specific behavioral phenomenon from a different vantage point. Consider loneliness. A clearcut topic for psychology, right? But is this topic a matter of how we feel or how we do (or don't) interact? Do you study cultural expectations, how we process information, or how we connect through social structures? A psychologist researching cognitive behavioral therapy may examine negative thought patterns. An economist may examine how a desire for acceptance drives decisions, especially in terms of market interactions. A cognitive scientist may examine mental frameworks for defining relationships. A sociologist may examine the role of community and how institutions shape life. An anthropologist may look at loneliness in terms of the internal logic, beliefs, and values of a culture as an integrated whole. Each valid approach can inform a better understanding of loneliness. The bis is just one example of how the behavioral sciences are diverse and wide-ranging, with researchers able to take on a specialized or interdisciplinary focus.

Every field of science has its research epistemology—that is, its core concepts, vocabulary, theories, assumptions, and conventions. But it is important to note that there are more distinctly different research approaches within the behavioral sciences disciplines than found among the fields of natural science<sup>16</sup>. The essential point here is that the behavioral sciences are highly contextual.

This guidebook introduces the scope for each behavioral sciences discipline, outlines student resources for researching with human subjects, and provides advice for those considering pursuing a career as a researcher in the behavioral sciences.

<sup>12</sup> <https://www.nature.com/articles/s41562-023-01555-3#:~:text=There%20has%20been%20%E2%80%9Ca%20remarkable,place%20over%20many%20preceding%20decades>

<sup>13</sup> <https://www.ncbi.nlm.nih.gov/books/NBK22624/>

<sup>14</sup> <https://www.jeffpooley.com/pubs/PooleyBehavioralSciences2016.pdf>

<sup>15</sup> <https://mainstay.com/blog/a-brief-history-of-the-science-behind-behavioral-intelligence/>

<sup>16</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

# Chapter 2: Anthropology

Let's start by expanding on our initial definition of *anthropology* as the study of the development of societies and cultures over time and across spaces. The American Anthropological Association recognizes anthropology as a broad approach to understanding the human experience<sup>17</sup>. Whereas some anthropologists focus on biological aspects such as genetics, bones, diet, and health, others research how humans lived in the past. Anthropologists may also research contemporary communities to better understand an insider's perspective. This can involve examining how people behave, interact, and organize social actions in varying contexts. The association states, "These four fields—human biology, archaeology, cultural anthropology, and linguistics—are understood to be the pillars on which the whole discipline rests"<sup>18</sup>.

So the overarching scope of concern is broad. At first glance, extremely so. Researchers in this discipline study some aspect of how societies and cultures form and develop<sup>19</sup>. And the notions of society and culture cover a lot in terms of potential phenomena. As defined by the National Geographic Society, *culture* can be considered people's learned behavior, including language, beliefs, social structures, institutions, and material goods<sup>20</sup>. Whereas *society* and *community* may speak to scale or be used interchangeably in some contexts, NGS cautiously defines a *civilization* as a complex human society that may have certain characteristics of cultural and technological development<sup>21</sup>.

I note "cautiously" because such terms can hold the weight of historical biases, regarded as ethnocentrism. But contemporary anthropologists aim to research human subjects in a way that brings clarity while limiting bias (as much as humanly possible). Anthropologists attempt to do so by observing people in their local environment, looking at customs and interactions (i.e., ethnography) and sometimes embedding themselves within the culture<sup>22</sup>. Those researchers who systematically record, analyze, and compare cultures to examine and explain differences are called ethnologists.

Anthropology can break down into many particular subfields. Linguistic anthropologists are clearly behavioral scientists in their study of how language drives thinking and interactions, as well as how it shapes society, beliefs, and all the other things anthropology is concerned with. But even biological/physical anthropologists will connect material specimens to social and cultural behaviors throughout history<sup>23</sup>. And archaeologists study material remains as a means to interpret human experiences and activities.

Anthropologists use a variety of techniques to research the origins of humanity and the dynamics of cultures: experiments, sampling, fieldwork, interviews, observation, analysis of text/artifacts/specimens/remains, scales and scaling, focus groups, and cultural immersion<sup>24</sup>. Historically, cultural anthropologists have relied on field observation, whereas physical anthropologists have relied on archeological excavation.

## A Short History of This Field of Research

The study of anthropology can be traced to ancient Greek and Roman cultures, and its evolution reflects humanity's evolving perspectives and relationships with other cultures. Its development into an academic field of research is entrenched in political, economic, and social forces throughout history<sup>25</sup>. Ancient Greek writings display an interest in history, human nature, and societal structures. Medieval scholars (and explorers) continued to write about the cultures they encountered<sup>26</sup>. Religious scholars in Europe during this time deliberated on human origins and cultural development. But written observations from the encounters among traders traveling to other continents were rarely in-depth or systematic.

The Age of Enlightenment during the 17<sup>th</sup> and 18<sup>th</sup> centuries marked a shift among scholars to more systematically "understand human behavior and society as phenomena that followed defined principles"<sup>27</sup>. With the prioritization of scientific and rational thought, scholars tackled challenging anthropological questions<sup>28</sup>. But much was written through the lens of colonization, with European scholars tending to describe others' differences in terms of inferiority. For instance, describing fellow humans as "primitives" is now recognized as racist in this discipline.

---

<sup>17</sup> <https://americananthro.org/learn-teach/what-is-anthropology/>

<sup>18</sup> <https://americananthro.org/learn-teach/what-is-anthropology/>

<sup>19</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>20</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>21</sup> <https://education.nationalgeographic.org/resource/civilizations/>

<sup>22</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>23</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>24</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>25</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>26</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>27</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

<sup>28</sup> <http://individual.utoronto.ca/boyd/anthro7.htm>

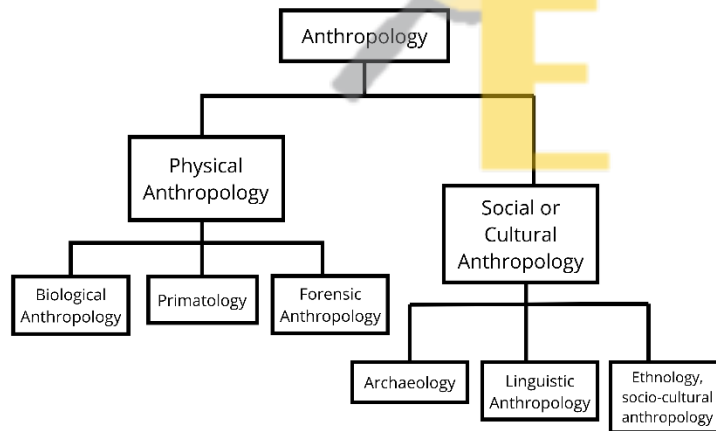
By the 19<sup>th</sup> century, the colonizing nations of Europe were interested in other cultures but also sought justifications for imperialistic aggression<sup>29</sup>. In response, societies of amateur anthropologists formed in the early 1800s, leading to professional roles and a more scientific approach to studying “exotic” cultures—as well as obtaining artifacts through ethical and unethical means. The excavation of remains began to suggest the true age of the planet and evolution of humans. But the ethnocentric research from this time can be seen as attempts to portray specific cultures as inferior—or to lump together and thus erase many small-scale societies.

Twentieth-century anthropologists sought to instead understand other cultures in their own terms by immersing themselves in new cultures while also seeking to more systematically depict findings derived from observation and ethnography<sup>30</sup>. Tools like CT scanners also allowed for more scientific inquiry. The focus for these professional researchers expanded from colonized countries to cover the world, including an anthropologist’s local environment. In the United States, researchers dived into particular cultures and conducted extended fieldwork<sup>31</sup>. In France, structuralists looked for common cultural patterns as a reflection of basic cognitive structures. In the mid-1900s, anthropology schools formalized into distinct fields of research, commonly falling within the categories of physical anthropology, archaeology, linguistic anthropology, cultural anthropology, and psychological anthropology—the latter focusing on how humans relate to cultures and social structures<sup>32</sup>.

In this 21<sup>st</sup> century, the range of anthropological research continues to expand while the specificity deepens<sup>33</sup>. Western anthropologists are increasingly focused on their own societies while also being studied by non-Western anthropologists, with the discipline actively embracing a diversity of theories and challenges to established conventions and perspectives. Anthropologists are also researching how humans can develop “new social connections and cultural identities”<sup>34</sup>. And many subfields are further integrating the natural and behavioral sciences on subjects such as health and the environment.

**Popular Academic Specializations for Anthropology Students**

- Anthropology of globalization
- Archaeological science
- Archaeology
- Biological anthropology
- Cultural anthropology
- Culture and heritage management
- Economic anthropology
- Environmental anthropology
- Gender and culture
- Human evolutionary biology
- Human rights and ethics
- Indigenous archeology
- Linguistic anthropology
- Medical anthropology
- Political anthropology
- Religious anthropology
- Science and technology studies
- Social justice anthropology
- Sociocultural anthropology



**University Highlight: University of California – Los Angeles**

UCLA offers one of the nation’s top programs in anthropology. Its [College of Anthropology](#) conducts research in archaeology, biological anthropology, linguistic anthropology, psychological and medical anthropology, and sociocultural anthropology. Offering both BA and BS tracks for undergraduates, the degree program requires an independent study course in literature-based research, project-based research, or a community/corporate internship. Students can also gain access to UCLA’s Institute of Archaeology Summer Field Program.

<sup>29</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>  
<sup>30</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>  
<sup>31</sup> <http://individual.utoronto.ca/boyd/anthro7.htm>  
<sup>32</sup> <https://www.britannica.com/science/anthropology>  
<sup>33</sup> <https://www.britannica.com/science/anthropology>  
<sup>34</sup> <https://education.nationalgeographic.org/resource/history-branches-anthropology/>

## Anthropology Professional Societies (and their online resources for students)

- [Society for Applied Anthropology](#). Site offers student memberships, along with access to topical interest groups, publications, education programs, and research at annual meetings. Site also lists universities that have shown a commitment in applied anthropology under its Education Programs tab.
- [The American Anthropological Association](#). Site includes details on resident scholar fellowships, an annual meeting sharing research, membership benefits for students, K-12 resources, internships, higher education resources, and publications requiring member access. The Education Resources tab includes articles about exploring anthropology subfields, making graduate school decisions, and advice for what to do with an anthropology degree. The Careers in Anthropology tab also describes career path options. K-12 student membership is available through its Junior Anthropologist Award; that membership provides access to 8 specialties, over 250,000 articles, and the opportunity to publish in *Anthropology News* and attend/present at the annual meeting. Under its K-12 Anthropology Resources tab, it details how to be nominated for the award, teaching and learning materials (such as open access textbooks, blogs, and standards resources), and information on high school internships.
- [The National Association for the Practice of Anthropology](#). Site includes application to enlist a mentor, as well as access to student memberships, publications, best practices, an ethical practice guide, and a toolkit for becoming a professional anthropologist. Under the Mentoring/Career tab, the site lists internship tips, field schools, and why to study anthropology.
- [World Council of Anthropological Associations](#). Site includes access to newsletters, working papers, webinars, and publications.

## Anthropology Conferences

- [Society for Applied Anthropology](#). Students are welcome to join scholars and social scientists to discuss ideas, methods, and solutions to real-world problems at its annual meeting. The event includes lectures, workshops, and tours.
- [The American Anthropological Association](#). With student rates available, the annual meeting includes 600+ scholarly sessions, workshops, poster sessions, an exhibit hall, and a film festival, with some activities online. In addition, the society organizes virtual events and mini-courses.
- [The National Association for the Practice of Anthropology](#). Its annual meeting includes poster sessions, workshops, and mentoring.

## Example Peer-Reviewed Anthropology Journals

- [American Anthropologist](#)
- [American Journal of Human Biology](#)
- [Cultural Anthropology](#)
- [Current Anthropology](#)
- [Economics & Human Biology](#)
- [Evolutionary Anthropology](#)
- [Human Ecology](#)
- [Journal of Human Evolution](#)

## Student-Run Anthropology Journals

- [Anthropology Now's Anthro/Zine](#)
- [Critical Theory and Social Justice Journal of Undergraduate Research](#)
- [EVOS Journal](#)
- [International Social Science Review](#)
- [Journal for Undergraduate Ethnography](#)
- [Journal of Integrated Social Sciences](#)
- [NEXUS](#)
- [Peer Review](#)
- [Social Moments](#)
- [Spaces Between](#)
- [Student Anthropologist](#)
- [The Dialectics](#)
- [The Unfamiliar](#)

## Often-Cited Recent Studies in Anthropology

Just as the study of anthropology is wide-reaching, so are its applications, be it to business, human rights, education, environmental issues, health and medicine, and so on. Thus, it can be difficult to reduce the history and current state of humanity down to a smaller list of *landmark* studies per se. So this collection dips a toe into this vast field, highlighting some of the recent most-cited studies from major anthropology journals.

### Economics & Human Biology

- Jutta Viinikainen, et al, [Does better education mitigate risky health behavior?](#), Aug 2022.
- Arianda Garcia-Prado, [Lockdown strictness and mental health effects among older populations in Europe](#), Apr 2022.
- Lucia Mangiavacchi, [Fathers matter](#), Aug 2021.
- Kien Le and My Nguyen, [The psychological burden of the COVID-19 pandemic severity](#), May 2021.
- Lauren Hoehn-Velasco, et al, [The great crime recovery](#), May 2021.
- David Blanchflower and Alex Bryson, [Unemployment and sleep](#), Dec 2021.
- Lisa Cameron, et al, [Childhood stunting and cognitive effects of water and sanitation in Indonesia](#), Jan 2021.
- Nina Boberg-Fazlic, et al, [Disease and fertility](#), Dec 2021.

### Journal of Human Evolution

- Meir Orbach and Reuven Yeshurun, [The hunters or the hunters](#), Nov 2021.
- Eleanor Scerri and Manuel Will, [The revolution that still isn't](#), June 2023.

- Amos Frumkin and Orr Comay, [The last glacial cycle of the southern Levant](#), Nov 2021.
- Kathleen Human, et al, [A new absolute date from Swartkrans Cave for the oldest occurrences of \*Paranthropus robustus\* and Oldowan stone tools in South Africa](#), July 2021.
- Kelsey Pugh, [Phylogenetic analysis of Middle-Late Miocene apes](#), Apr 2022.
- Reuven Yeshurun, et al, [Early Upper Paleolithic subsistence in the Levant](#), Nov 2021.
- Rachel Lupien et al, [Eastern African environmental variation and its role in the evolution and cultural change of \*Homo\* over the last 1 million years](#), Aug 2021.
- Nick Ashton and Rob Davis, [Cultural mosaics, social structure, and identity](#), July 2021.

*American Journal of Human Biology*

- Clarence Gravlee, [Systemic racism, chronic health inequities, and COVID-19](#), Aug 2020.
- Reynaldo Martorell, [Improved nutrition in the first 1000 days and adult human capital and health](#), Jan 2017.
- Johan Eriksson, Eero Kajantie, et al, [Boys live dangerously in the womb](#), Apr 2010.
- Christopher Kuzawa and Elizabeth Sweet, [Epigenetics and the embodiment of race](#), Oct 2008.
- Peter Gluckman, Mark Hanson, et al, [Early life events and their consequences for later disease](#), Dec 2006.



# Chapter 3: Criminology

Distinct from the field of law, criminology is the study of the nonlegal aspects of criminal and deviant behavior within a society, as well as its impact on victims. This involves examining crime, criminals, and criminal justice in the context of pertinent laws, statistics, historical context, and research (including sociology, psychology, economic, cognitive science, and legal). Criminologists research crime as a social phenomenon in terms of behavior as it relates to making laws, enforcing laws, breaking laws, and reacting to the breaking of laws<sup>35</sup>.

In this discipline, researchers seek behavioral insight to inform policy making and public discourse regarding how laws are created, violated, enforced, and adjudicated<sup>36</sup>. Research involves taking a scientific approach to analyzing phenomena, although results may be combined with ethical considerations when making recommendations. Primary data collection methods include: official statistics compiled by government agencies and law enforcement organizations, as well as self-report studies, victim surveys, interviews, focus groups, and ethnographic studies<sup>37</sup>. Pure research focuses on providing clarity in understanding crime, and applied research informs how criminals are treated/rehabilitated and how crime is prevented.

The scope of criminology may seem more targeted than the preceding chapter on anthropology, but the implications of its research can be far-reaching in terms of the stability of a society and how policing can continue to evolve as society evolves.

## A Short History of this Field of Research

Criminology originated in the 18th century as Europeans who ran asylums and collected statistics on court proceedings and incarceration developed theories on crime and punishment<sup>38</sup>. A humanistic, classical school of thought focused on improving criminal justice by eliminating torture, other forms of cruelty, and arbitrary punishment<sup>39</sup>. This was soon followed by the neo-classical school of thought that acknowledged that behavior can be irrational, people can make mistakes, and self-defense can be justifiable.

In the early 19<sup>th</sup> century, countries like France began publishing annual crime statistics, which were examined for patterns by statisticians and sociologists<sup>40</sup>. Theorists contended with the notion that criminal behavior is the result of societal structure. By the end of the 19<sup>th</sup> century, criminology had become a more formal area of study that was solidified in the 20<sup>th</sup> century. By the end of the 1900s, criminology encompassed a number of specializations including victimology (focused on victims) and criminal justice (focused on the institutions of law and order). Research also matured alongside forensic science and tools such as photography, toxicology, fingerprinting, and DNA evidence<sup>41</sup>.

Criminology today continues to advance alongside the ability to capture, analyze, and model larger sources of data. It has a continuing focus on understanding motives, preventing crime, and determining appropriate consequences<sup>42</sup> while continuing to reflect evolving societal values. For example, research has increased on the difference between expressive, less premeditated crime and instrumental motivations for crime with a tangible self-benefit. Focus has also increased on how society reacts to crime.

## Popular Academic Specializations for Criminology Students

- Corrections
- Criminal justice
- Criminology research
- Cybercrime
- Juvenile justice
- Law and society
- Restorative justice
- Victimology

## University Highlight: University of Pennsylvania

[The University of Pennsylvania in Philadelphia](#) has a highly rated criminology program that is the only undergraduate major in criminology available at an Ivy League university. The interdisciplinary program emphasizes applied quantitative social science and how the products of that science can inform public policy. Undergraduates participate in courses focused on bio-psychological-social analysis of crime, often undertaking laboratory-based analyses. In addition, criminal justice research courses train students to undertake and critically evaluate quantitative research on crime and criminal justice. The program is producing research in the areas of: courts, crime, police, prison, probation and parole, and research methods.

<sup>35</sup> <https://academic.oup.com/book/501/chapter-abstract/135264649?redirectedFrom=fulltext>

<sup>36</sup> <https://wilson.fas.harvard.edu/aphorisms/criminology>

<sup>37</sup> <https://uollb.com/blogs/uol/sources-of-data-for-criminological-research?srsltid=AfmBOoqnd8hb7fR1Wi5acsW2OjuvPIS-3lb4l1N9TrU82gbihaxKyc79>

<sup>38</sup> <https://academic.oup.com/book/501/chapter-abstract/135264649?redirectedFrom=fulltext>

<sup>39</sup> <https://www.criminology.com/the-history-of-criminology-2/>

<sup>40</sup> <https://www.britannica.com/science/criminology>

<sup>41</sup> <https://www.britannica.com/science/criminology>

<sup>42</sup> <https://www.criminology.com/the-history-of-criminology-2/>

## Criminology Professional Societies (and their resources for students)

- [Academy of Criminal Justice Sciences](#). Site offers student memberships, including one free year for graduate students. Resources include publications, an annual meeting, and reviews of degrees and academic programs. Its standards for bachelor's degrees can be used to help students judge programs at prospective schools.
- [American Society of Criminology](#). Site includes access to publications, internships, and research opportunities. Resources include access to research, mentors, and funding, with student memberships available. Under the Education and Resources tab, it offers links to internships, student collaboration opportunities, and a free online course on "What is Criminology?"
- [British Society of Criminology](#). With a membership category for U.K. students, the site provides access to publications, an annual conference, and specialist networks (including an early career researchers' network).
- [European Society of Criminology](#). Site provides access to its journal, newsletter, working groups, and a summer school, with student membership open to Europeans.
- [Asian Criminological Society](#). Site includes access to its two journals, books, and upcoming events.
- [Criminological Society of Africa](#). Site includes access to its publications, with subject-specific collections.

## Criminology Conferences

- [Academy of Criminal Justice Sciences](#). With student rates available, the annual meeting includes workshops, a doctoral summit, tours, and exhibits.
- [American Society of Criminology](#). With student rates available, the annual meeting includes exhibits and a review of recent studies.
- [European Society of Criminology](#). With student rates available, the annual conference allows members to present papers on the results of their own research projects.

## Example Peer-Reviewed Criminology Journals

- [American Journal of Criminal Justice](#)
- [Annual Review of Criminology](#)
- [British Journal of Criminology](#)
- [Criminal Justice and Behavior](#)
- [Criminology](#)
- [Criminology & Public Policy](#)
- [Journal of Criminal Justice](#)
- [Journal of Research in Crime and Delinquency](#)
- [Justice Quarterly](#)

## Student-Run Criminology Journals

- [American Journal of Criminal Law](#)
- [Crime and Ethics](#)
- [Journal of Criminal Law and Criminology](#)
- [Social Moments](#)
- [The International Journal of Law, Ethics, and Technology](#)
- [The Journal of Politics and International Affairs](#)

## Often-Cited Studies in Criminology

The following list shares major studies published by the most-cited scholars in criminology journals<sup>43</sup>.

1. **Robert Sampson and John Laub:**  
RJ Sampson and JH Laub, [Crime in the making](#), *Crime & Delinquency*, 1993.  
RJ Sampson, et al, [Neighborhoods and violent crime](#), *Science*, 1997.
2. **David Farrington and Alex Piquero:**  
AR Piquero, DP Farrington, et al, [The criminal career paradigm](#), *Crime and Justice*, 2003.  
AR Piquero and SA Tibbetts, [Specifying the direct and indirect effects of low self-control and situational factors in decision-making](#), *Justice Quarterly*, 1996.
3. **Terrie Moffitt:**  
TE Moffitt, [Adolescence-limited and life-course-persistent antisocial behaviour](#), *Psychological Review*, 1993.  
TE Moffitt, et al, [Sex differences in antisocial behaviour](#), *Cambridge University Press*, 2001.
4. **Francis Cullen and TC Pratt:**  
TC Pratt and FT Cullen, [The empirical status of Gottfredson and Hirschi's general theory of crime](#), *Criminology*, 2000.  
TC Pratt and FT Cullen, [Assessing macro-level predictors and theories of crime](#), *Crime and Justice*, 2005.
5. **Daniel Nagin:**  
DS Nagin and KC Land, [Age, criminal careers, and population heterogeneity](#), *Criminology*, 1993.  
DS Nagin and R Paternoster, [Enduring individual differences and rational choice theories of crime](#), *Law and Society Review*, 1993.

<sup>43</sup> [https://www.researchgate.net/profile/Ellen-Cohn-4/publication/279171733\\_The\\_Most\\_Cited\\_Scholars\\_in\\_Five\\_International\\_Criminology\\_Journals\\_2006-10/links/55ad30c508ae98e661a417cd/The-Most-Cited-Scholars-in-Five-International-Criminology-Journals-2006-10.pdf](https://www.researchgate.net/profile/Ellen-Cohn-4/publication/279171733_The_Most_Cited_Scholars_in_Five_International_Criminology_Journals_2006-10/links/55ad30c508ae98e661a417cd/The-Most-Cited-Scholars-in-Five-International-Criminology-Journals-2006-10.pdf)

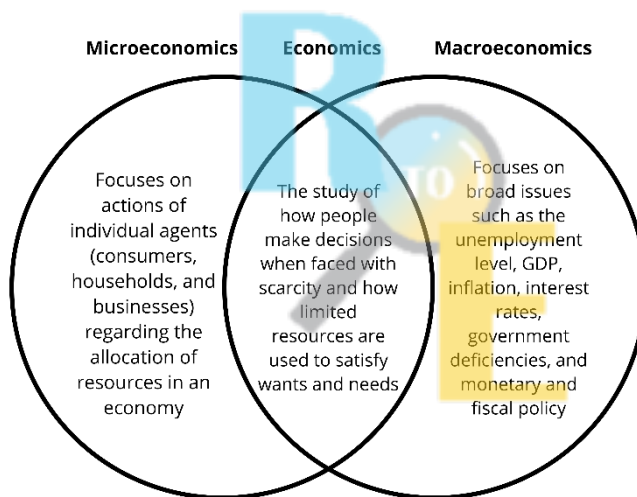
# Chapter 4: Economics

Economics is the study of material scarcity and prosperity, including how wealth is produced, consumed, and transferred. This discipline focuses on the production, distribution, and consumption of goods and services at the micro (i.e., individual behavior) and macro (i.e., aggregate behavior across an economy) levels<sup>44</sup>. Economists study how limited resources are owned, used, and exchanged by individuals, institutions, and regions. Behavior comes into play in terms of the choices made by those actors, in both rational and irrational ways. Research helps to explain these behaviors, which can have ramifications for all facets of life.

Economics is the behavioral science that most often relies on quantitative data and traditional statistical and calculus-based data analysis. That information may come from observation, market figures, statistical analysis, and mathematical models<sup>45</sup>. Common metrics include unemployment rates, price levels, income distribution, and output in terms such as quality and productivity. Qualitative factors are wide-ranging, such as economic ideology and the state of labor relations. Interestingly, most economic datasets are not generated for the purpose of economic research<sup>46</sup>. Instead, economists often work with data pulled for other purposes such as government policy-making where they must infer what else the data could indicate. U.S. data sources include<sup>47</sup>:

- macroeconomic data (e.g., Bureau of Labor Statistics and the Congressional Budget Office),
- survey data (e.g., the Census Bureau),
- data by sector (e.g., the Bureau of Justice Statistics and the Bureau of Transportation Statistics), and
- country-level data (e.g., the World Bank and the World Trade Organization).

Methods for analyzing that data can vary by specific economic schools of thought. Like the other behavioral sciences, continuing maturation of the discipline has led to an expanding list of specializations, some with competing assumptions, core concepts, and foundational theories. As seen in modern America, political perspectives can inform differing perspectives on economic phenomena.



## A Short History of This Field of Research

European theorists in the 18<sup>th</sup> century are credited with igniting the study of modern economics. Inspired by Enlightenment philosophy, French economists (called physiocrats at the time) began methodically examining how economies work in order to propose how they *should* work. Scottish writer Adam Smith is widely regarded as the “father of economics.” He examined capitalism, free markets, division of labor, supply and demand, and gross domestic product, with his famous 1776 work *The Wealth of Nations* considered the foundational text of economic theory.

In the 19<sup>th</sup> century, economists began drilling down into how markets operate and how prices are set<sup>48</sup>. Research was largely presented in defense of specific economic theories, such as the theory of marginalism to explain how individuals choose to buy, sell, or produce something. Whereas classical economists focused on capitalism, other models such as socialism were also dissected.

In the early 20<sup>th</sup> century, the field of economics was hugely influenced by British theorist John Maynard Keynes, who developed macroeconomics as an area of study and focused on how governments can intervene to shape an economy. By the end of the 1900s,

<sup>44</sup> <https://www.investopedia.com/terms/e/economics.asp>

<sup>45</sup> [https://www.economicsonline.co.uk/competitive\\_markets/what\\_is\\_economics.html/](https://www.economicsonline.co.uk/competitive_markets/what_is_economics.html/)

<sup>46</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>47</sup> <https://www.aeaweb.org/about-aea/committees/economic-statistics/data-resources>

<sup>48</sup> <https://www.investopedia.com/articles/economics/08/economic-thought.asp>

the bifurcated approach to analyzing micro- and macroeconomics would dominate Western schools<sup>49</sup>. Competing theories would develop characterizing free markets as either efficient and beneficial or as inherently prone to fail. And within each ideology are further competing theories, such as the questioning whether to focus on fiscal or monetary policy within a Keynesian framework.

In the 21<sup>st</sup> century, different strands of investigation have continued to develop<sup>50</sup>. Economists are specializing in new theories including behavioral economics, pure and applied economics, and industrial and financial economics—all linked by an interest in clarifying how choices are made. As trade grows more complex, so do economic theories. Research must account for complex financial models along with evolving values<sup>51</sup>. Mathematics, statistics, and computational modeling are core tools to account for myriad variables. Most difficult of all is accounting for the unpredictability and irrationality of human behavior in the marketplace.

### Popular Academic Specializations for Economics Students

- American economic history
- Applied math and economics
- Behavior and strategy
- Business economics
- Computer science and economics
- Data science
- Econometrics
- Economic history
- Financial economics
- International economics
- International macro-finance
- Managerial economics
- Mathematical economic analysis
- Policy, poverty, and inequality
- Sports economics

### University Highlight: Harvard University

Recognized in multiple rankings as the top economics program for undergraduates, [Harvard's Department of Economics](#) offers the university's largest concentration with a notable depth of course options within a BA degree structure. Fields of study include: theory, behavioral economics, econometrics, financial economics, public economics, economic history, labor economics, political economy, macroeconomics, economic development, industrial organization, and international economics. The department operates a [Semester Undergraduate Program for Economics Research](#), which pairs students with faculty for semester-long research assistant positions, including at the globally respected National Bureau of Economic Research.

### Economics Professional Societies (and their resources for students)

- [American Economic Association](#). Site offers details on publications, annual meetings, and resources including data sources, best practices, and economics links specifically for students. Some high school students qualify for free access to its journals. Student resources include: What is economics?, careers in economics, information for high school students, free access to the AEA journal for high school students, and a listing of useful resources including student journals and interesting blogs and podcasts.
- [European Economic Association](#). Site includes student memberships, with access to its journal, papers, and council members.
- [Society for the Advancement of Economic Theory](#). Site includes open access to *Economic Theory* journal.
- [World Economics Association](#). Site offers access to books, journals, commentaries, textbooks, and alternative texts and teaching links. Student membership includes access to library, conferences, and a young economists' network.

### Economics Conferences

- [American Economic Association](#). With student rates available, the annual meeting coordinates 66 associations known as the Allied Social Science Associations to present papers on general economics topics.
- [European Economic Association](#). The annual congress includes lectures, panel debates, invited sessions, and paper sessions.
- [Society for the Advancement of Economic Theory](#). The annual conference for researchers focuses on theoretical economics.
- [World Economics Association](#). The society offers both webinars and conferences to present papers and have discussion forums.

### Example Peer-Reviewed Economics Journals

- [Econometrica](#)
- [International Economic Review](#)
- [Journal of Political Economy](#)
- [Quantitative Economics](#)
- [Quarterly Journal of Economics](#)
- [Review of Economic Studies](#)
- [Review of Economics and Statistics](#)

### Student-Run Economics Journals

- [Berkeley Economic Review](#)
- [Columbia Economics Review](#)
- [ECONPress](#)
- [Issues in Political Economy](#)
- [Philosophy, Politics, and Economics Review](#)
- [Stanford Economic Review](#)
- [Student Economic Review](#)
- [Student Monthly Labor Review](#)
- [The Developing Economist](#)
- [Undergraduate Economic Review](#)

<sup>49</sup> <https://www.investopedia.com/articles/economics/08/economic-thought.asp>

<sup>50</sup> [https://www.economicsonline.co.uk/competitive\\_markets/what\\_is\\_economics.html/](https://www.economicsonline.co.uk/competitive_markets/what_is_economics.html/)

<sup>51</sup> <https://www.investopedia.com/articles/economics/08/economic-thought.asp>

## Landmark Studies in Economics

Economics sciences is one of the six categories recognized by the Nobel Foundation, recognizing remarkable contributions made by specific researchers, sometimes over the course of decades. The links below summarize this research and provide links to researchers' original publications.

- 2024 for [explaining why some countries are rich and some are poor](#)
- 2023 for [advancing our understanding of women's labour market outcomes](#)
- 2022 for [research on banks and financial crises](#)
- 2021 for [empirical contributions to labour economics](#) and [methodical contributions to the analysis of causal relationships](#)
- 2020 for [improvements to auction theory and inventions of new auction formats](#)
- 2019 for [an experimental approach to alleviating global poverty](#)
- 2018 for [integrating climate change into long-run macroeconomic analysis](#) and [integrating technological innovations into long-run macroeconomic analysis](#)
- 2017 for [contributions to behavioural economics](#)
- 2016 for [contributions to contract theory](#)
- 2015 for [analysis of consumption, poverty, and welfare](#)

## Milestone Papers in Economics

The following papers, reflecting conventional economic theory established in the 1900s, were pulled from research featured in the collection *Landmarks of Finance and Economics*<sup>52</sup>, with links included below where reports are open access online.

- Frank Ramsey, [A mathematical theory of saving](#), *Economic Journal*, Dec 1928. Ramsey's optimal growth model—which has since become known as the Ramsey model—is one of the earliest applications of the calculus of variations to economics.
- Emile Grunberg and Franco Modigliani, [The predictability of social events](#), *Journal of Political Economy*, Dec 1954. Rational expectations is the economic theory describing how predictions of events influence behavior.
- Franco Modigliani and Merton Miller, [Dividend policy, growth, and the valuation of shares](#), *The Journal of Business*, Oct 1961. Franco Modigliani, [The Modigliani-Miller propositions after thirty years](#), *Journal of Economic Perspectives*, 1989. The Modigliani-Miller Theorem demonstrates that a firm's market value is independent of its capital structure and dividend policy.
- William Vickrey, [Counterspeculation, auctions, and competitive sealed tenders](#), *Journal of Finance*, March 1961. Paul Milgrom and Robert Weber, [A theory of auctions and competitive bidding](#), *Econometrica*, Sept 1982. Vickrey's paper was the first to use game theory to explain the dynamics of auctions and derive auction equilibria. Milgrom and Weber's paper further advances auction theory by describing a general symmetric model of auctions that does not assume that the values of the bidders are symmetrical.
- Vernon Smith. [An experimental study of competitive market behavior](#), *Journal of Political Economy*, Apr 1962. This is a pioneering paper on controlled experimentation in economics.
- Albert Ando and Franco Modigliani, [The 'life-cycle' hypothesis of saving: aggregate implications and tests](#), *American Economic Review*, Mar 1963. The Life-cycle Theory of Saving and Consumption predicts that savings rates depend on the age of consumers and hence on the demographic structure of society.
- George Stigler, [The economics of information](#), *Journal of Political Economy*, June 1961, and [Information in the labor market](#), *Journal of Political Economy*, Oct 1962. Challenging the theory of perfect competition, Stigler describes how market equilibrium should be characterized by a distribution of prices whose variance relates to the cost of searching for information.
- Gary Becker, [Investment in human capital](#), *Journal of Political Economy*, Oct 1962. Becker provides a general theory for a household's allocation of time.
- Eugene Fama, [The behavior of stock market prices](#), *Journal of Business*, Jan 1965. The Efficient-Market theory asserts it is impossible to outperform the market by using information the market already knows, except through luck.
- Eugene Fama, [The adjustment of stock prices to new information](#), *International Economic Review*, Feb 1969. This is the first study of the impact of new information on stock prices, introducing event-time analysis.
- Robert Merton, [Lifetime portfolio selection under uncertainty](#), *Review of Economics*, Aug 1969. Merton formulated an investment strategy for deciding how much to consume, how much to invest, and how to allocate the investments between stocks and risk-free assets in order to maximize expected lifetime utility.
- GA Akerlof, [The market for lemons](#), *Quarterly Journal of Economics*, Aug 1970. The most-cited paper on economic theory, this report details the asymmetry that occurs when the seller knows more about a product than the buyer.
- Fischer Black and Myron Scholes, [The pricing of options and corporate liabilities](#), *Journal of Political Economy*, 1973. Robert Merton, [Theory of rational option pricing](#), *Bell Journal of Economics and Management Science*, 1973. Most techniques employed today are rooted in the option pricing model developed by Black, Scholes, and Merton.
- Stephen Ross, [The arbitrage theory of capital asset pricing](#), *Journal of Economic Theory*, Dec 1976. Richard Roll and Stephen Ross, [An empirical investigation of the arbitrage pricing theory](#), *Journal of Finance*, Dec 1980. The arbitrage pricing theory allows for an explanatory model of asset returns.

<sup>52</sup> <https://www.manhattanrarebooks.com/pages/books/908/landmarks-of-finance-and-economics?soldItem=true>

- Daniel Kahneman and Amos Tversky, [Prospect theory](#), *Econometrica*, Mar 1979. This study addresses nonutility-maximizing decisions by noting (and determining the implications of) the fact that people are more sensitive to losses than gains.
- Robert Engle and C Granger, [Co-integration and error correction](#), *Econometrica*, Mar 1987. Co-integration allows analysts to test for a statistically significant connection between apparently related time series such as a stock market index and the price of its associated futures contract.
- Eugene Fama, [The cross-section of expected stock returns](#), *Journal of Finance*, June 1992, and [Common risk factors in the returns on stocks and bonds](#), *Journal of Financial Economics*, Feb 1993. These papers detail the Fama-French three factor model of market behavior, explaining more than 90 percent of diversified portfolios returns.
- Andrei Schleifer and Robert W. Vishny, [The limits of arbitrage](#), *The Journal of Finance*, Mar 1997. Nobuhiro Kiyotaki and John Moore, [Credit cycles](#), *Journal of Political Economy*, Apr 1997. These papers warned of the types of market failure that contributed to the great recession of 2008.



# Chapter 5: Neuroscience/Cognitive Science

*Cognitive science* and *neuroscience* are sometimes used interchangeably. And in some instances, *neuroscience* is used interchangeably with *neurobiology*, separate from *cognitive neuroscience*. The focus within the behavioral sciences is different from the biological focus of neurology in the health sciences. Given our focus, we'll define this discipline as the study of intelligence structures and how the brain processes information. Neuroscientists and cognitive scientists research the human mind to clarify how the brain processes and manipulates information to form knowledge. In short, these researchers explore how the brain computes inputs. The Department of Cognitive Science at Johns Hopkins University explains, "Conceiving of the mind as an abstract computing device instantiated in the brain, cognitive scientists endeavor to understand the mental computations underlying cognitive functioning and how these computations are implemented by neural tissue"<sup>53</sup>.

To characterize the structure of human intellectual functioning, researchers may observe or initiate experiments with human subjects or they may work to digitally model cognitive processes<sup>54</sup>. Primary data collection methods include:

- tools for assessing brain function (e.g., EEG, CAT, and fMRI),
- the Lesion method for correlating behavior and brain areas,
- tools for modulating brain activity (e.g., transcranial magnetic stimulation),
- behavioral tests,
- eye-tracking procedures,
- digital models of neural networks, and
- neuropsychological assessments (i.e., test batteries assessing mental functions)<sup>55</sup>.

This research can also draw from findings from computer science, artificial intelligence, linguistics, mathematics, philosophy, neurology, anthropology, sociology, and psychology. Thus, this discipline pulls from a variety of epistemologies and research methodologies.

## A Short History of This Field of Research

Like other behavioral sciences, cognitive science has roots in Ancient Greek, when philosophers tried to characterize the nature of human knowledge<sup>56</sup>. These ruminations expanded beyond the domain of philosophy with the development of experimental psychology in the 19<sup>th</sup> century. As psychological experiments became more systematic, observable behavioral responses were distinguished from internal computation processes.

In the mid 1900s, modern research began in earnest regarding the capacity of human thinking in terms of functions such as short-term memory and language development<sup>57</sup>. So cognitive science and neuroscience grew of age at the same time as the primitive beginnings of computers and the academic field of AI. Psychologist George Miller proposed cognitive science as a separate field at an early IT symposium at MIT in 1956<sup>58</sup>, just as computer scientists were beginning to focus on cognitive concerns. He reflected later in a personal history his "strong conviction, more intuitive than rational, that human experimental psychology, theoretical linguistics, and the computer simulation of cognitive processes were all pieces from a larger whole, and that the future would see a progressive elaboration and coordination of their shared concerns"<sup>59</sup>.

Discipline-specific institutions, journals, and professional societies were established in the 1970s. Given its interdisciplinary nature, cognitive science research developed hand in hand with advances in other disciplines, notably neurology and computing. Universities with cognitive science Phd programs have grown to include more specialized master's degrees and now some bachelor's degrees in the discipline. For instance, MIT's cognitive sciences program is housed in its own department but partners with the Department of Electrical Engineering and Computer Science. At Rice University, the bachelor of arts degree in cognitive sciences requires courses in linguistics, neuroscience, philosophy, and psychology, with all students required to also take computer science and statistical analysis courses. This is a nascent field where much of the activity is still conducted specifically through university research<sup>60</sup>.

<sup>53</sup> <https://cogsci.jhu.edu/about/>

<sup>54</sup> <https://ruccs.rutgers.edu/academics/undergraduate/about-cognitive-science>

<sup>55</sup> <https://pressbooks.pub/cognition/chapter/behavioural-and-neuroscience-methods/#:~:text=Well%2Dknown%20techniques%20are%20the,us%20more%20about%20brain%20functions>

<sup>56</sup> <https://plato.stanford.edu/entries/cognitive-science/#His>

<sup>57</sup> <https://plato.stanford.edu/entries/cognitive-science/#His>

<sup>58</sup> <https://www.normfriesen.info/papers/edtechinreverse.html>

<sup>59</sup> Miller G A 1979 A Very Personal History (Occasional paper no. 1). Center for Cognitive Science, Cambridge, MA (<https://exhibits.stanford.edu/feigenbaum/catalog/yq383yp2653>).

<sup>60</sup> <https://www.apa.org/education-career/guide/subfields/brain-science/education-training>

### Popular Academic Specializations for Neuroscience/Cognitive Science Students

- Cognitive neuroscience
- Cognitive neuroscience and evolutionary psychology
- Computation and AI
- Computational modeling
- Decision and cognition
- Evolution and development
- Human computer interactions
- Language and cognition
- Language and psycholinguistics
- Language science
- Machines and computation
- Music cognition
- Neurobiology and neuropsychology
- Perception
- Perception and action
- Philosophy and cognition

### University Highlight: Massachusetts Institute of Technology

MIT offers a leading program in the cognitive sciences. Part of the MIT School of Science, [the Department of Brain and Cognitive Sciences](#) administers an undergraduate course on Brain and Cognitive Sciences, along with the course Computation and Cognition in partnership with the Department of Electrical Engineering and Computer Science. It also manages a [doctoral program](#) with areas of focus in cognitive neuroscience, systems neuroscience, cellular and molecular neuroscience, and computation. The department is also the base for a robust [research](#) program aimed at reverse engineering the brain to understand the mind. Its Research Scholars Program is a prestigious two-year, non-degree, fully funded post-baccalaureate program for outstanding recent college graduates who plan to pursue a research career in cognitive, systems or cellular neuroscience, cognitive science, computational cognitive science, computational neuroscience, or neuroengineering—allowing participants to become competitive PhD applicants.

### Neuroscience/Cognitive Science Professional Societies (and their resources for students)

- [Cognitive Neuroscience Society](#). Site details its annual meeting and cognitive neuroscience news. Membership discounts available for students in college.
- [Cognitive Science Society](#). Site includes access to its journal, conferences, and its listserv. Membership discounts available for students in college.
- [Society for Neuroscience](#). Site includes access to [publications](#) and tools for early career and higher education. With discounts for college students, members can present abstracts and [access](#) engagement opportunities including educational events. The Careers tab includes careers overview and short [scientific courses](#).

### Neuroscience/Cognitive Science Conferences

- [Cognitive Neuroscience Society](#). With college student rates available, the annual meeting includes workshops, data blitzes, exhibits, and poster sessions.
- [Cognitive Science Society](#). With in-person and online proceedings, the annual meeting includes symposiums and awards presentations.
- [Society for Neuroscience](#). Billed as the world's largest neuroscience conference, the conference allows high school students to attend with a chaperone for a heavily discounted rate.

### Example Peer-Reviewed Neuroscience/Cognitive Science Journals

- [Affective Science](#)
- [Behavioral and Brain Functions](#)
- [Behavioral Neuroscience](#)
- [Behavioural Brain Research](#)
- [Brain, Behavior, and Immunity](#)
- [Cognitive, Affective, & Behavioral Neuroscience](#)
- [Frontiers in Human Neuroscience](#)
- [Nature Human Behavior](#)
- [Nature Neuroscience](#)
- [Neuroscience & Biobehavioral Reviews](#)

### Student-Run Neuroscience/Cognitive Science Journals

- [Brain Matters](#)
- [Canadian Undergraduate Journal of Cognitive Science](#)
- [Cognitive Science Student Journal](#)
- [Compos Mentis](#)
- [Grey Matters](#)
- [Impulse](#)
- [International Youth Neuroscience Association Journal](#)
- [Potential](#)

## Often-Cited Studies in Neuroscience/Cognitive Science

With landmark studies from *Cognitive Science* listed [here](#)<sup>61</sup>, the following list shares some of the most-cited recent studies from key journals.

### *Neuroscience & Biobehavioral Reviews* (partially open access with some abstract-only files)

- Maxime Marvaldi, et al, [Anxiety, depression, trauma-related, and sleep disorders among healthcare workers during the COVID-19 pandemic](#), July 2021.
- Lise Eliot, et al, [Dump the “dimorphism,”](#) June 2021.
- Nasrin Abdoli, [The global prevalence of major depressive disorder \(MDD\) among the elderly](#), Jan 2022.
- Lisa Diamond and Jenna Alley, [Rethinking minority stress](#), July 2022.
- Rebecca Alexander, et al, [The neuroscience of positive emotions and affect](#), Feb 2021.

### *Frontiers in Human Neuroscience* (open access)

- Suzana Herculano-Houzel, [The human brain in numbers](#), Nov 2009.
- Harriet Feldman and Karl Friston, [Attention, uncertainty, and free-energy](#), Dec 2010.
- David Vago and Silbersweig David, [Self-awareness, self-regulation, and self-transcendence](#), Oct 2012.
- Stephen Fleming and Hakwan Lau, [How to measure metacognition](#), July 2014.
- Robin Lester Carhart-Harris, et al, [The entropic brain](#), Feb 2014.

### *Brain, Behavior, and Immunity* (primarily open access with some abstract-only files)

- Felicia Ceban, et al, [Fatigue and cognitive impairment in Post-COVID-19 Syndrome](#), March 2022.
- Elaine Robertson, et al, [Predictors of COVID-19 vaccine hesitancy in the UK household longitudinal study](#), May 2021.
- Mario Gennaro Mazza, [Persistent psychopathology and neurocognitive impairment in COVID-19 survivors](#), May 2021.
- Thor Mertz Schou, et al, [Psychiatric and neuropsychiatric sequelae of COVID-19](#), Oct 2021.

### *Behavioural Brain Research* (partially open access with some abstract-only files)

- C. Domingos, et al, [Effects of physical activity on brain function and structure in older adults](#), March 2021.
- Meixiang Cheng, et al, [AMPK: A bridge between diabetes mellitus and Alzheimer’s disease](#), Feb 2021.
- Georg Northoff and Federico Zilion, [Temporo-spatial theory of consciousness](#), April 2022
- Samah Labban, et al, [Effects of melatonin and resveratrol on recognition memory and passive avoidance performance in a mouse model of Alzheimer’s disease](#), April 2022.

### *Behavioral and Brain Functions* (open access)

- Goran Soderlund, et al, [The effects of background white noise on memory performance in inattentive school children](#), Sept 2010.
- Lutz Jancke and Pascale Sandmann, [Music listening while you learn](#), Jan 2010.
- Amy Devine, et al, [Gender differences in mathematics anxiety and the relation to mathematics performance while controlling for test anxiety](#), July 2012.
- Bhoomika Kar, et al, [Cognitive development in children with chronic protein energy malnutrition](#), July 2008.

---

<sup>61</sup> <https://pcl.sitehost.iu.edu/rgoldsto/cogsci/classics.html>

# Chapter 6: Psychology

Likely the first discipline for people to envision when they hear *behavioral sciences*, psychology is the study of how the human mind influences behavior. In its definition, the American Psychological Association notes that psychologists examine not only the relationships between brain function and behavior but also the relationship between environment and behavior<sup>62</sup>.

Psychologists apply the scientific method to understanding the motives for behavior. Like the other behavioral sciences, it is cross-disciplinary in nature and its study has involved increased specialization. The largest professional field within psychology is counseling and clinical psychology, involving assessment and therapeutic treatment. Both this and other psychology fields are driven by research that may involve psychometric tests, interviews, direct observation, meta-data analysis, experiments, and structural analysis, as well as assessments of a program's impact on behavior. At a high level, psychology research can be organized into three major areas: research that describes behavioral phenomena, research that finds correlations or connections between data points, and experiments that test hypotheses about human behavior. Basic research seeks to understand psychological processes, and applied research seeks solutions for specific problems<sup>63</sup>.

Fields of research include<sup>64</sup>:

- Biopsychology—The study of the physiological bases of behaviors, overlapping with neuroscience
- Child psychology—The study of young people in the context of their local environment and capabilities
- Clinical psychology—The study of the assessment, diagnosis, and treatment of mental disorders and health problems
- Coaching—The study of behavior, cognition, and emotion to clarify performance, achievement, and well-being
- Cognitive psychology—The study of memory and thinking as drivers of behavior, overlapping with neuroscience
- Counseling—The study of working with someone's specific psychological experience to alleviate distress and enable recovery
- Developmental psychology—The study of cognitive, emotional, and social changes through life stages
- Forensic psychology—The study of psychological principles such as recovery and rehabilitation in the context of the criminal justice system
- Health psychology—The study of how biology, behavior, and environment influence health status and health care
- Industrial-organization/Occupational psychology—The study of psychological principles in improving workplace performance and well-being
- Learning/Educational psychology—The study of how people learn, as well as the effectiveness of school programs and teaching practices
- Neuropsychology—The study of the relationship between structure and function driving the brain, including the behavior component of treatment for brain injuries and neurological diseases
- Personality psychology—The study of individual differences and how psychological processes develop in individuals
- Sports psychology—The study of psychological principles that influence athletic participation and individual and team performance

## A Short History of This Field of Research

Again, we begin by acknowledging the roots of psychology theories with the contributions of ancient Greek philosophers such as Plato and Aristotle. And the Age of Enlightenment continued to wrestle with the same fundamental questions. But modern psychology began to form as a discipline in the 19<sup>th</sup> century. A German laboratory was established in 1879 to study adult thinking and behavior, with a laboratory forming in Canada ten years later to focus on mental development<sup>65</sup>. So both general and developmental psychology formed in a close time range while following similar but separate paths. In 1890, American William James wrote *The Principles of Psychology*, examining issues that would inform the discipline's research agenda for a century<sup>66</sup>. While German structuralists studied the nature of consciousness and the basic elements of the psychological experience, North American functionalists researched evolutionary psychology<sup>67</sup>.

Looking at psychology research in universities, the first half of the 20<sup>th</sup> century was dominated by an American focus on behaviorism, with its reliance on empirical phenomena rather than speculation about consciousness and introspection<sup>68</sup>. Early contributions of

<sup>62</sup> <https://www.apa.org/education-career/guide/science>

<sup>63</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>64</sup> <https://www.bps.org.uk/what-psychology> and <https://pressbooks.cuny.edu/intropsychhurson/chapter/1-2-the-evolution-of-psychology-history-approaches-and-questions/>

<sup>65</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC6491641/>

<sup>66</sup> <https://www.britannica.com/science/psychology>

<sup>67</sup> <https://pressbooks.cuny.edu/intropsychhurson/chapter/1-2-the-evolution-of-psychology-history-approaches-and-questions/>

<sup>68</sup> <https://www.britannica.com/science/psychology>

behaviorists helped to form theories about learning, conditioning, and the role of prior experiences<sup>69</sup>. Also during this time, the European school of psychodynamic/psychoanalytic psychology focused on unconscious drives, popularized by Sigmund Freud. This school acknowledged that humans can be irrational in their motives and desires while contributing theories about secure attachment, adaptive functioning, and the role of interpersonal relationships<sup>70</sup>.

Clinical and cognitive psychology expanded significantly in the second half of the 20<sup>th</sup> century, with universities researching all aspects of human behavior and thinking. Cognitive psychology looked beyond behaviorism to explain how humans perceive and learn. By the end of the 1900s, researchers were thoroughly exploring social-cultural impacts on thinking and behavior, including how people perceive themselves and influence each other<sup>71</sup>.

Researchers continue to explore personality, individual differences, innate dispositions/abilities, and social behavior while developing diverse theoretical models to test<sup>72</sup>. Research has drilled down into complex information processes, multiple levels of awareness, the brain's plasticity, and how a person's characteristics shift in varying contexts. And the research methods have moved beyond stimulus control to more sophisticated frameworks for appraisal, including leveraging technology such as functional MRI to examine brain activity. As specializations mature within the discipline of psychology, they become inherently more integrated with disciplines in the natural and health sciences, as well as the other behavioral sciences.

### Popular Academic Specializations for Psychology Students

- Behavior analysis
- Biopsychology
- Clinical psychological science
- Coaching
- Cognitive neuroscience
- Cognitive science
- Counseling
- Culture and society
- Early childhood cognition and development
- Forensic
- Health psychology
- Human factors
- Industrial-organizational
- Infant mental health
- Judgment and decision-making
- Learning and development
- Neuropsychological science
- Personality and social contexts
- Pre-occupational therapy psychology
- Pre-physical therapy psychology
- Psychobiology
- Social
- Sports

### University Highlight: Stanford University

Housed within its School of Humanities and Science, the [Department of Psychology at Stanford](#) is often ranked as one of the top programs for undergraduates. This includes six pathways for students in: cognitive science, early childhood, health psychology, judgment and decision-making, neuroscience, and finally, mind, culture, and society. Research opportunities within undergraduate studies include summer research and special laboratory projects supervised by current faculty.

### Psychology Professional Societies (and their resources for students)

- [American Psychological Association \(APA\)](#). Resources include publications, databases, research, and news. Site offers networks and communities for college students, as well as provides [career advice](#) to students. High school students can join the American Psychological Association of Graduate Students ([APAGS](#)). The Become a Psychologist tab describes career paths, advice on becoming a psychological scientist, descriptions on subfields, career planning guides, individual development plan resources, a psychology student network, and helpful data from APA's Center for Workforce Students.
- [Association for Psychological Science](#). In addition to access to journals, videos, and career resources, the site allows visitors to drill down into specific research topics to access articles and news. The Careers tab includes career profiles and insights.
- [Society for Clinical Psychology](#). Resources include details on psychological treatments, principles for training, and advances in psychotherapy. With college student discounts available, membership includes a mentorship program and eligibility for student awards. A division of APA.
- [Society for Personality and Social Psychology](#). Site offers access to training programs, journals, publishing resources, journals, and online learning. College student memberships are available. A division of APA.

### Psychology Conferences

- [American Psychological Association \(APA\)](#). With student rates available, the annual convention is the largest gathering of psychologists and psychology students in the world. It includes keynotes, ethics sessions, and a poster competition. Student can also apply to present their research. Previous sessions can be watched online.

<sup>69</sup> <https://pressbooks.cuny.edu/intropsychhuron/chapter/1-2-the-evolution-of-psychology-history-approaches-and-questions/>

<sup>70</sup> <https://www.britannica.com/science/psychology>

<sup>71</sup> <https://pressbooks.cuny.edu/intropsychhuron/chapter/1-2-the-evolution-of-psychology-history-approaches-and-questions/>

<sup>72</sup> <https://www.britannica.com/science/psychology>

- [Association for Psychological Science](#). With student rates available, the association holds both an annual convention and an online global psychological science summit.
- [Society for Clinical Psychology](#). The inaugural conference included presentations and awards for poster presentations. The next comes in 2026.
- [Society for Personality and Social Psychology](#). With student rates available, the annual convention includes symposiums, single presenter papers, data blitzes, and workshops.

### Example Peer-Reviewed Psychology Journals

- [American Psychologist](#)
- [Annual Review of Psychology](#)
- [Clinical Psychology Review](#)
- [Emotion](#)
- [Frontiers in Psychology](#)
- [Health Psychology and Behavioral Medicine](#)
- [Journal of Applied Psychology](#)
- [Journal of Experimental Psychology](#)
- [Personality and Individual Differences](#)
- [Psychological Bulletin](#)
- [Psychological Methods](#)
- [Psychological Review](#)

### Student-Run Psychology Journals

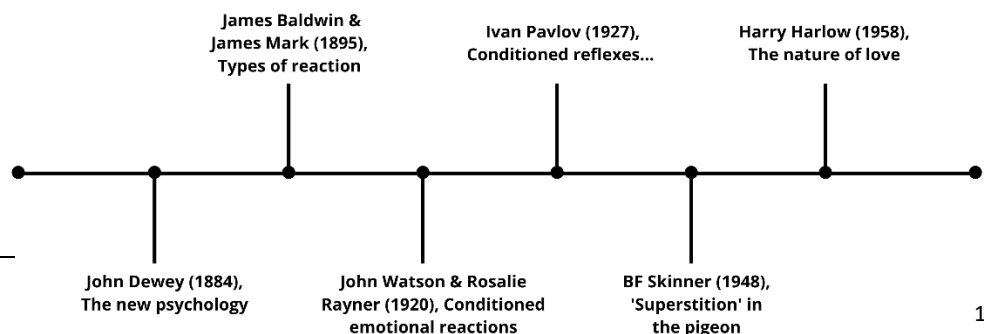
- [Journal of European Psychology Students](#)
- [Psi Beta Journal of Research](#)
- [Psi Chi Journal of Psychological Research](#)
- [Social Moments](#)
- [The Journal of Psychology and Behavioral Sciences](#)
- [The Journal of Undergraduate Ethnic Minority Psychology](#)
- [The Undergraduate Research Journal of Psychology at UCLA](#)
- [The Yale Review of Undergraduate Research in Psychology](#)
- [Undergraduate Journal of Psychology at Berkeley](#)

### Landmark Studies and Papers in Psychology

The following list includes landmark psychology experiments and studies on behaviorism that have helped shaped conventional theory. (For access to research in others areas of psychology [including developmental theory, intelligence testing, perception, and neuropsychology], there is an open-access collection offered through York University [here](#)<sup>73</sup>.)

- John Dewey, [The new psychology](#), *Andover Review*, 1884.
- Charles Peirce and Joseph Jastrow, [Small differences in sensation](#), *Memoirs of the National Academy of Sciences*, 1884.
- James Cattell, [Attention and reaction](#) (R. S. Woodworth, Trans.), originally published in *Philosophische Studien*, 1893.
- AB Hill and R Watanabe, ["Sensorial" and "muscular" reactions](#), *American Journal of Psychology*, 1894.
- James Baldwin and James Mark, [Types of reaction](#), *Psychological Review*, 1895.
- Robert Yerkes, et al, [The relation of strength of stimulus to rapidity of habit-formation](#), *Journal of Comparative Neurology and Psychology*, 1908.
- Robert Yerkes and Sergius Morgulis, [The method of Pawlov in animal psychology](#), *Psychological Bulletin*, 1909.
- John Watson and Rosalie Rayner, [Conditioned emotional reactions](#), *Journal of Experimental Psychology*, 1920.
- Karl Lashley, [The behavioristic interpretation of consciousness](#), *Psychological Bulletin*, 1923.
- Mary Jones, [A laboratory study of fear](#), *Pedagogical Seminary*, 1924.
- Ivan Pavlov, [Conditioned reflexes: An investigation of the physiological activity of the cerebral cortex](#) (G. V. Anrep, Trans.), originally published by Oxford University Press in 1927.
- Karl Lashley, [Basic neural mechanisms in behavior](#), *Psychological Review*, 1930.
- Clark Hull, [The concept of the habit-family hierarchy and maze learning: Part I](#) and [Part II](#), *Psychological Review*, 1934.
- BF Skinner, [Two types of conditioned reflex and a pseudo type](#), *Journal of General Psychology*, 1935.
- J Konorski and S Miller, [On two types of conditioned reflex](#), *Journal of General Psychology*, 1937.
- BF Skinner, ["Superstition" in the pigeon](#), *Journal of Experimental Psychology*, 1948.
- Edward Tolman, [Cognitive maps in rats and men](#), *Psychological Review*, 1948.
- DO Hebb, [Drives and the C.N.S. \(conceptual nervous system\)](#), *Psychological Review*, 1955.
- Harry Harlow, [The nature of love](#), *American Psychologist*, 1958.
- Keller Breland and Marian Breland, [The misbehavior of organisms](#), *American Psychologist*, 1961.

### Six of the Most Influential Studies in Psychology



<sup>73</sup> <https://psychclassics.yorku.ca/topic.htm>  
Researching Humans © 2025

# Chapter 7: Sociology

Our final discipline to examine is sociology, the study of social life, including how humans interact and form societies. The American Sociological Society notes that all human behavior is social, so the span of interest is equally expansive<sup>74</sup>. Sociologists might research: the nature of societies; shared and differing expressed beliefs and values; the causes and consequences of human behavior; the patterns of interactions, relationships, and culture; the structure of groups, institutions, and societies; or how a social environment influences thought and action. The interactions of concern can range from one-to-one to one-to-many to the relationships between different parts of the globe. So research may require searching for patterns at a high level or determining how a person's will affects choice at the individual level<sup>75</sup>.

Sociology has come of age in pace with contemporary research practices, seeking to provide empirical evidence. But it might be the behavioral science most influenced by the humanities, with traditionally qualitative research methods<sup>76</sup>. That is, instead of relying on numbers and statistical analysis as an economist may tend to do, sociologists instead tend to focus on meaning-based input. Primary data collection methods include: social surveys, structured/unstructured/semi-structured interviews, participant observation, experiments, and secondary analysis<sup>77</sup>.

Using social constructionist, interpretive, and contextualized methods<sup>78</sup>, sociologists often “study people in their natural setting and attempt to make sense of phenomena in terms of the meanings that people bring to them<sup>79</sup>”. For those unfamiliar with these methods, *social constructionism* is the view that all knowledge and thus all perceived reality is contingent on human practices<sup>80</sup>. *Interpretivism* is a sociology approach based on the idea that the social world is ontologically different from the natural world and requires specific methodological tools to be understood<sup>81</sup>. And by *contextualized*—in this context—I mean situated within constructs of power like wealth, race, and gender.

It is important in sociology to select/institute a specific philosophical framework through which to systematically apply qualitative measures. Among many, these frameworks include<sup>82</sup>:

- Positivism and post-positivism—Rejecting religious depictions, positivists emphasized experiment, induction, and careful observation. Critical reactions within science to positivism are considered post-positivists, such as interpretivism.
- Logical positivism and critical realism—Logical positivism embraces the verification principle that a proposition can be true either by definition or by empirical verification. Critical realism is the social offshoot of scientific realism, which views scientific theory existing independently of our knowledge of it.
- Structuralism—These approaches attempt to understand human culture in the context of overarching systems.
- Deconstructionism—These approaches reveal: the apparent unity of certain constructs, hidden idealizations of origin, dependence on language for knowledge, and how terms reach a privileged status without conclusive logic.
- A genealogical lens—Genealogical methods connect the formation of specific knowledge with institutional and cultural practices.
- Postcolonial theory—In response to imperialism, this theory centers themes of race, nation, empire, migration, and ethnicity.
- Feminist lenses—Feminist frameworks critique classical social theory and seek to redress androcentrism (reflecting the point of view of men, with negative consequences for women). Poststructuralist feminist frameworks seek to offer methodological approaches that more accurately research women's lives.

## A Short History of This Field of Research

Again drawing from ancient Greek philosophy, specifically sociological concerns began being theorized at pace with political science and economic theory in the 18<sup>th</sup> and 19<sup>th</sup> centuries<sup>83</sup>. French philosopher August Comte coined the term *sociology* in the 1830s, proposing a discipline uniting all knowledge regarding human activity<sup>84</sup>. The first coined *sociology* class was taught at the University of Kansas in 1890, and the first professional society was formed that same decade in France<sup>85</sup>.

<sup>74</sup> <https://www.asanet.org/about/what-is-sociology/>

<sup>75</sup> <https://www.asanet.org/wp-content/uploads/savvy/introsociology/Documents/Field%20of%20sociology033108.htm>

<sup>76</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>77</sup> <https://www.northcentralcollege.edu/news/2023/01/13/important-research-methods-sociology>

<sup>78</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>79</sup> Dorsten, L & L Hotchkiss. *Research Methods and Society: Foundations of Social Inquiry*. Upper Saddle River, NJ: Pearson Prentice Hall, 2005. P 147.

<sup>80</sup> <https://lo.unisa.edu.au/course/view.php?id=6745&sectionid=112361>

<sup>81</sup> <https://lo.unisa.edu.au/course/view.php?id=6745&sectionid=112361>

<sup>82</sup> <https://lo.unisa.edu.au/course/view.php?id=6745&sectionid=112361#Late%2019th%20c%20objections%20to%20positivism>

<sup>83</sup> <https://www.britannica.com/topic/sociology>

<sup>84</sup> <https://www.asanet.org/wp-content/uploads/savvy/introsociology/Documents/Field%20of%20sociology033108.htm>

<sup>85</sup> <https://www.asanet.org/wp-content/uploads/savvy/introsociology/Documents/Field%20of%20sociology033108.htm>

As the discipline took hold, scholars attempted to carve out many divergent paths, taking methods from other sciences and inventing some of their own<sup>86</sup>. Early research explored evolutionary theory, looking at natural selection, variance, and social Darwinism. Sociologists pulled from biological ecology to form a theory of human ecology, researching how social structures adapt to environments. The discipline also explored the concept of economic determinism. In the first half of the 1900s, sociological research began to expand to examine geographic, psychological, and anthropology-influenced cultural theories to explain human behavior. Research flourished in the mid 1900s and then experienced a segmentation similar to other behavioral sciences, with European researchers focusing more on group behavior and American researchers focusing more on individualistic behaviors<sup>87</sup>.

### Popular Academic Specializations for Sociology Students

- Community development
- Environmental sociology
- Family and health services
- Global and international sociology
- Human relations and business
- Law and society
- Medical sociology
- Organizational studies
- Social analysis and research
- Social movements
- Social service
- Sustainability
- Women’s and gender studies

### University Highlight: University of California – Berkeley

UC Berkeley has had one of the world’s leading sociology programs for more than half a century. Its [Sociology Department](#) offers an undergraduate degree balancing sociological theory and training in research methods. The bachelor of arts degree requires coursework in the evaluation of evidence (i.e., research methods and procedures) and the choice of introductory statistics or logic. Students can seek research involvement and potential funding through the Office of Undergraduate Research, with opportunities to help in faculty/graduate student research or to initiate their own research projects as undergraduates. Sociology advisors can help students leverage various college programs for research funding.

### Sociology Professional Societies (and their resources for students)

- [American Sociological Association](#). Site details [annual meeting](#), academic resources, and publications. With membership, students can access special events, a student [forum](#), [paper awards](#), an honors program, funding opportunities, and an advisory board. The Academic and Professional Resources [tab includes](#) information about majoring in sociology and careers with a sociology PhD. The Resources tab includes a [data dashboard to view](#) sociology trends and patterns.
- [International Sociological Association](#). Site provides access to [research networks](#), publications, conferences, and national associations. “Jr sociologists” receive access to a worldwide [competition](#), dissertation abstracts, and a network for PhD students.
- [Institute for Social Research](#). Site allows visitors to drill down into [research](#) by topics such as civil discourse and data and methods. Resources includes education programs, student research opportunities, and a junior professional researcher program.

### Sociology Conferences

- [American Sociological Association](#). The annual meeting is an outlet for more than 3,000 research papers and more than 4,500 presenters. Discounted membership rates are available for college students and high school teachers of sociology.
- [International Sociological Association](#). The society hosts a forum of sociology, as well as a call for youth representatives to the United Nations on behalf of the professional organization.

### Example Peer-Reviewed Sociology Journals

- [American Journal of Sociology](#)
- [American Sociological Review](#)
- [Journal of Marriage and Family](#)
- [Social Indicators Research](#)
- [Social Science Research](#)
- [Sociological Methods & Research](#)
- [Socius](#)

### Student-Run Sociology Journals

- [Aleph](#)
- [El Río](#)
- [Invoke](#)
- [Journal of Integrated Social Sciences](#)
- [Journal of Interpersonal Relations, Intergroup Relations and Identity](#)
- [Producing Public Sociology](#)
- [Social Moments](#)
- [Sociology between the Gaps](#)

### Landmark Studies in Sociology

This section highlights studies regarded as landmark research and theory (originally referenced [here](#)<sup>88</sup> and [here](#)<sup>89</sup>, with direct links to published work embedded in the following bulleted list).

<sup>86</sup> <https://www.britannica.com/topic/sociology>

<sup>87</sup> <https://www.britannica.com/topic/sociology>

<sup>88</sup> <https://www.thoughtco.com/major-sociological-studies-and-publications-3026649>

<sup>89</sup> <https://helpfulprofessor.com/sociology-examples/>

- Thomas Robert Malthus, [An essay on the principle of population](#), 1798. A seminal essay on sociology and economics examining population growth.
- Max Weber, [The protestant ethic and the spirit of capitalism](#), 1905. A series of German essays, this text explores the relationship between religion and economic behavior.
- Emile Durkheim, [The elementary forms of religious life](#), 1912. A book based on a sociological study of an Australian group's religious beliefs and how they inform social cohesion.
- Max Weber, [Economy and society](#), 1922. A series of German essays then published together as a book in English, this text examines social stratification in terms of class, status, and power.
- Robert Merton, [Social structure and anomie](#), *The American Sociological Review*, 1938. Merton posited that deviance arises when a society encourages specific goals but simultaneously restricts the means to achieve them.
- Louis Wirth, [Urbanism as a way of life](#), *American Journal of Sociology*, 1938. Wirth articulated key characteristics of urban life affected by population size, density, and diversity.
- Solomon Asch, [Effects of group pressure upon the modification and distortion of judgments](#), *Groups, Leadership and Men: Research in Human Relationships*, 1951. Asch's experiments demonstrated how people conform to majority opinion, highlighting the substantial influence of societal norms on individual behaviors.
- James Coleman, [Equality of educational opportunity](#), U.S. Dept of Health, Education, and Welfare, 1966. Coleman revealed the role of family background and social context in student achievement.
- Clifford Geertz, [Deep play: Notes on the Balinese cockfight](#), *The Interpretation of Cultures*, 1973. Using the cockfight as a cultural text to understand Balinese society, Geertz examined culture's complexity.
- Sandra Lipsitz Bem, [Gender schema theory](#), *Psychological Review*, 1981. This paper details how societies create frameworks that affect our understanding of what it is to be male or female, shaping our attitudes and behaviors.
- Richard Alba and Victor Nee, [Rethinking assimilation theory for a new era of immigration](#), *The International Migration Review*, 1997. This study examined how ethnic boundaries change by examining the assimilation process of immigrants in the United States, underscoring ethnicity's dynamic nature.
- Robert Sampson, [Collective efficacy theory](#), *Encyclopedia of Criminological Theory*, 1997. This study links crime rates with neighborhood characteristics.



# Chapter 8: Researching with Human Subjects

As noted, human behavior is highly contextual. It is extremely complex. There is no list covering every variable in human behavior, because the variables are infinite. The NIH notes that:

*The behavioral and social sciences are far more complex and variable than some of the natural sciences; not only is there an almost uncountable number of factors affecting individual and social behavior, but these factors combine and interact in extremely complex and mutable ways<sup>90</sup>.*

Conducting research with human subjects (i.e., test participants) is particularly challenging. Each discipline of the behavioral sciences has grown in sophistication based on lessons learned in ethically handling human subjects, rigorously constructing studies, accounting for human behavior in implementing sound research practices, and testing results for validity. Primarily, it is important to understand the context for why it is important to protect human subjects in research.

## History of Misconduct and the Creation of Ethical Guidelines

Just as the roots of the behavioral sciences can be traced back to ancient Greece, so too can a history of human experimentation. Herophilus, the father of anatomy, performed vivisections on prisoners, becoming the first recorded person to perform surgery on live subjects for the sake of research<sup>91</sup>. The Hippocratic Oath of ethical standards for doctors also originates in ancient Greece, emphasizing the need to avoid harming a patient; but adoption of that oath was quite gradual over the centuries<sup>92</sup>.

Abuses of human subjects in the name of science during the 1900s prompted advances in protection<sup>93</sup>. Particularly egregious examples include: unwitting subjects allowed to suffer the harsh effects of syphilis in the 1930s Tuskegee Experiment<sup>94</sup>, the German atrocities of eugenics during World War II, and the administering of thalidomide in the 1950s and 1960s to pregnant women primarily in Europe and Canada causing birth defects<sup>95</sup>. Specifically in the behavioral sciences, early psychological experiments ignored or actually harmed the health of subjects. In a groundbreaking 1920 study called the “Little Albert Experiment,” researchers sought to explore how behavior can be influenced by introducing a phobia of rats to a previously emotionally stable young boy<sup>96</sup>. Be it small children, pregnant women, European Jews during WWII, or Black American soldiers in Tuskegee, there is a pattern of making stark decisions on behalf of vulnerable populations.

In response to German experiments occurring during the Holocaust, the Nuremberg Code of international ethics was created in 1947 to require informed consent from a human subject to participate in research<sup>97</sup>. This was reinforced by the Declaration of Helsinki in 1964<sup>98</sup>. The Thalidomide scandal spurred action from many governments, including the United States strengthening federal oversight of drug testing and including a requirement for informed consent. Dr. Henry K. Beecher produced a landmark study of abuses in 1966, which helped to create a model ethical framework for human patients and research subjects<sup>99</sup>. And the discovery in the 1970s of the Tuskegee Experiment spurred tighter regulations for federally funded human research, including creating the National Commission for the Protection of Human Subjects in Biomedical and Behavioral Research in 1974. This commission published the Belmont Report<sup>100</sup> in 1979, which has since guided federal regulations regarding human subjects in the United States.

The NIH has published that: “Education on ethics and emerging complex ethical issues, global awareness, and governmental cooperation and sanctions are important steps in addressing the inadequacies in protecting the most vulnerable populations in experimentations worldwide. Investigators must always remember that the primary safeguards of protecting human life rest in their hands”<sup>101</sup>. Today, strict adherence to ethical frameworks and institutional guidelines is critical in protecting all human subjects, while remaining especially vigilant for potentially vulnerable populations.



<sup>90</sup> <https://www.ncbi.nlm.nih.gov/books/NBK22624/>

<sup>91</sup> <https://pubmed.ncbi.nlm.nih.gov/19708428/>

<sup>92</sup> <https://www.nlm.nih.gov/hmd/topics/greek-medicine/index.html>

<sup>93</sup> <https://mainstay.com/blog/a-brief-history-of-the-science-behind-behavioral-intelligence/>

<sup>94</sup> <https://www.mcgill.ca/oss/article/history/40-years-human-experimentation-america-tuskegee-study>

<sup>95</sup> <https://history.nih.gov/display/history/Human+Subjects+Timeline>

<sup>96</sup> <https://mainstay.com/blog/a-brief-history-of-the-science-behind-behavioral-intelligence/>

<sup>97</sup> <https://www.nejm.org/doi/full/10.1056/NEJM199711133372006>

<sup>98</sup> <https://pubmed.ncbi.nlm.nih.gov/19708428/>

<sup>99</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC3272525/>

<sup>100</sup> <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html>

<sup>101</sup> <https://pubmed.ncbi.nlm.nih.gov/19708428/>

## Guidelines for Research with Human Subjects

Researchers must prioritize the well-being of human subjects over the pursuit of general knowledge. Ethical conduct applies to professionals and students alike, especially when involving human subjects.

Three of the most widely regarded recommendations come from the NIH, the American Psychological Association (APA), and the World Medical Association (WMA). Most countries also have government regulations pertaining to human participants in research. In the United States, universities conducting research must comply with the HHS Department's Office for Human Research Protections (OHRP) Code of Federal Regulations Title 45, part 46<sup>102</sup>, which protects participants' rights and welfare.

### U.S. National Institutes of Health Guidelines

The NIH Clinical Center advises researchers to uphold seven main principles in conducting ethical research, including the planning, implementation, and follow-up with human subjects<sup>103</sup>. This guidance is especially applicable to studies focused on health concerns.

1. Social and Clinical Value—Studies must justify risks by offering valuable insights.
2. Scientific Validity—Research must follow sound, accepted methods.
3. Fair Subject Selection—Choices should be driven by science, not convenience or bias.
4. Favorable Risk-Benefit Ratio—Risks must be minimized and benefits maximized.
5. Independent Review—An institutional review board (IRB) must assess study ethics and risk.
6. Informed Consent—Participants decide freely, knowing risks, benefits, and methods.
7. Respect for Participants—Safeguard privacy, rights, and welfare throughout the study.

### American Psychological Association

The APA's Committee on Human Research (CHR) has set ethical guidelines **specifically for U.S.-based high school students** conducting research projects involving human subjects<sup>104</sup>. These guidelines were developed in accordance with federal rules and regulations and the APA Code of Ethics standards pertaining to research and publication.

A summary of the CHR's recommendations for conducting research with human participants follows:

- Before beginning a research project, students identify a qualified academic supervisor, who assumes primary responsibility for all aspects of the research project and is familiar with pertinent research on the student's chosen topic and APA's ethical guidelines.
- Students and supervisors should understand ethical guidelines, relevant government regulations, and school policies before beginning a study with human subjects.
- The rights and welfare of participants and their data should be protected by adherence to federal, state, and local laws and by school district policies.
- Students should determine how data will be analyzed, stored, and shared, using third-party companies that have been adequately vetted for data collection and management.
- Before beginning a research project, students should become familiar with the relevant research literature.
- Schools should form review committees to examine the merit and procedures for all research proposals, including possible benefits/risks and the informed consent forms and process.
- Students' proposals should include: the study question and purpose, the research design and analysis plan, procedures and why they were chosen, safeguards set in place for participants, any potential issues regarding vulnerable participants, how confidentiality will be maintained, what will be done to detect and mitigate harmful effects, and the process for obtaining informed consent in an ethical manner.
- Supervisors should consider sensitive topics and populations (e.g., child abuse and participants with cognitive impairments) that would not be appropriate for study by a high school student.
- Data should be collected without identifiers to protect participants' privacy. The participant must be informed if confidentiality cannot be ensured. Participants should also be informed of the circumstances under which confidentiality may be broken, given state/local laws or school policies. Students should describe who will be authorized to have access to the data, including supervisors and databases for analyzing, storing, sharing, or communicating data.
- When unsure of how to apply ethical guidelines, the study team should consult with the CHR at the APA (at [science@apa.org](mailto:science@apa.org)). The CHR can also try to assist qualified students in identifying resources, including local faculty advisors.

<sup>102</sup> <https://www.ecfr.gov/on/2018-07-19/title-45/subtitle-A/subchapter-A/part-46>

<sup>103</sup> <https://www.nih.gov/health-information/nih-clinical-research-trials-you/guiding-principles-ethical-research>

<sup>104</sup> <https://www.apa.org/science/leadership/research/ethical-conduct-humans>

## World Medical Association

WMA has a thorough code of medical ethics that includes guidelines on research with human subjects<sup>105</sup>. Pulled and in some cases summarized from a longer code, the following guidelines are especially applicable to medical research with a behavioral sciences component:

### Study Design

- Since medical research takes place in the context of various structural inequities, researchers should carefully consider how the benefits, risks, and burdens are distributed.
- Meaningful engagement with participants and their communities should occur before, during, and following the research.
- The purpose of the research can never take precedence over the rights and interests of research participants.
- The responsibility to protect participants must always rest with physicians or other researchers and never with the research participants, even though they have given consent.
- Researchers must consider the ethical, legal, and regulatory norms and standards for research involving human participants, as well as applicable international norms and standards.
- Medical research involving human participants must be conducted and supervised by individuals with the appropriate education, training, and qualifications.
- Every precaution must be taken to protect the privacy of participants and the confidentiality of their personal information.

### Risks, Burdens, and Benefits

- Research must be preceded by careful assessment of predictable risks and burdens to human participants.
- Risks must be monitored, assessed, mitigated, and documented by the researcher.
- When the risks and burdens are found to outweigh the potential benefits, researchers must assess whether to continue, modify, or immediately stop the research.

### Individual, Group, and Community Vulnerability

- Groups underrepresented in medical research should be provided appropriate access to participate in research.
- Individuals, groups, and communities who are more vulnerable as research participants should receive specifically considered support and protections.

### Scientific Requirements and Research Protocols

- Medical research involving human participants must have a scientifically sound and rigorous design and execution that are likely to produce reliable, valid, and valuable knowledge and avoid research waste. The research must conform to generally accepted scientific principles and be based on a thorough knowledge of the scientific literature.
- The design of research involving human participants must be clearly described and justified in a research protocol. The protocol should contain a statement of the ethical considerations.

### Free and Informed Consent

- Participation by individuals capable of giving informed consent in medical research must be voluntary.
- Potential participants must be adequately informed in plain language of the aims, methods, anticipated benefits, potential risks and burdens, qualifications of the researcher, sources of funding, any potential conflicts of interest, provisions to protect privacy and confidentiality, incentives for participants, and any other relevant aspects of the research.
- Potential participants must be informed of the right to refuse to participate in the research or to withdraw.
- All participants should be given the option of being informed about research results.
- Those incapable of giving consent must only be included if the research is likely to either personally benefit them or if it entails only minimal risk and minimal burden.
- The researcher must fully inform participants which aspects of their care are related to the research.
- Any collection and storage of data from participants for multiple and indefinite uses should be consistent with requirements set forth in the WMA Declaration of Taipei<sup>106</sup>.

---

<sup>105</sup> <https://www.wma.net/policies-post/wma-declaration-of-helsinki/#:~:text=Even%20well%2Dproven%20interventions%20should,protect%20their%20health%20and%20rights>

<sup>106</sup> <https://www.wma.net/what-we-do/medical-ethics/declaration-of-taipei/>

## Resources for Student Researchers

Student researchers with no experience conducting studies involving human subjects would benefit from completing the five lessons in the U.S. Department of Health and Human Services' training: [Human Research Protection Foundational Training](#)<sup>107</sup>. In about five hours, this training covers when HHS regulations apply, what is human subjects research, what are IRBs, the regulatory requirements for IRB review, and the institutional oversight of human research.

Those students needing to refer to legislation and regulations that affect the conduct of research with human participants should start with these websites:

- [NIH policy and compliance: Human subjects research](#)<sup>108</sup>
- [HHS: Office for Human Research Protections](#)<sup>109</sup>
- Department of Health and Human Services - [45CFR46](#)<sup>110</sup>
- [HHS: The privacy rule](#)<sup>111</sup>
- [Mandatory reporters: Summary of state laws](#)<sup>112</sup>

The APA also has organized the following resources for guidance on human research protection issues:

- [Psychological research online: Opportunities and challenges](#)
- [Ethical and policy issues in research involving human participants](#) (NBAC report)
- [Protecting participants and facilitating social and behavioral sciences research](#) (NRC report)
- [Research involving persons with mental disorders that might affect decision-making capacity](#) (NBAC report)
- [Resources for research ethics education: Human subjects](#)
- [Responsible research: A systems approach to protecting research participants](#) (IOM report)
- [University of Minnesota consent module](#)
- [Ethics in research with human participants](#) (APA book)

Whereas this brief guidebook is an introduction to critical ethical issues in researching with human subjects, these APA resources provide a navigable next step in ensuring research is conducted responsibly.

## Research Considerations Regarding Human Behavior

Research support and research training within the behavioral sciences lags well behind those in other sciences<sup>113</sup>. Behavioral sciences research is constrained<sup>114</sup> by the complexity of human behavior, as well as the significant and far-reaching legal and ethical constraints with establishing replicable conditions introduced in the first half of this chapter. Researchers often must aim at continuously shifting targets, contending with characteristics that easily mutate in the real world<sup>115</sup>. Human behavior is rarely reducible to lower-level mechanisms without stripping research of its insight. Without the linear relations that occur in the physical or "hard" sciences, it is difficult for behavioral sciences research to meet "conventional benchmarks of good science"<sup>116</sup>. It has been long assumed that as the behavioral sciences matured, its research designs, methods, and measures would become more rigorous and refined and, in turn, produce similarly immutable theories and laws<sup>117</sup>. As the six core disciplines of the behavioral sciences have matured, they have actually become more distinct from other sciences, developing varied research approaches, methods, definitions, theories, and vocabularies. That is, rather than producing immutable findings, research has required greater nuance and understanding of context and complex research methods.

So in this section, let's consider these additional research challenges regarding human behavior in terms of constructing a study, applying "sound" research practices, and gauging the validity of research results.

---

<sup>107</sup> <https://www.hhs.gov/ohrp/education-and-outreach/human-research-protection-training/human-research-protection-foundational-training/index.html>

<sup>108</sup> <https://grants.nih.gov/policy-and-compliance/policy-topics/human-subjects>

<sup>109</sup> <https://www.hhs.gov/ohrp/index.html>

<sup>110</sup> <https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html>

<sup>111</sup> <https://www.hhs.gov/hipaa/for-professionals/privacy/index.html>

<sup>112</sup> <https://cwig-prod-prod-drupal-s3fs-us-east-1-s3.amazonaws.com/public/documents/manda.pdf>

<sup>113</sup> <https://www.ncbi.nlm.nih.gov/books/NBK22624/>

<sup>114</sup> <https://www.sciencedirect.com/science/article/pii/S0732118X23000077>

<sup>115</sup> <https://link.springer.com/article/10.1007/BF01476359> and

[https://www.embopress.org/doi/pdf/10.1038/sj.embor.7401147?getft\\_integrator=sciencedirect\\_contenthosting&utm\\_source=sciencedirect\\_contenthosting](https://www.embopress.org/doi/pdf/10.1038/sj.embor.7401147?getft_integrator=sciencedirect_contenthosting&utm_source=sciencedirect_contenthosting)

<sup>116</sup> <https://www.sciencedirect.com/science/article/pii/S0732118X23000077>

<sup>117</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

### Constructing a Research Study

A research study needs an answerable question approached through feasible research methods. Researchers look to accepted practices within their discipline for constructing a study structure, or framework. This framework must account for ethical guidelines, legal regulations, institutional rules, and logistical limitations in answering a specific research question with relevant findings. This framework dictates the design of the study—that is, the parameters for proceeding. A researcher may ask:

- What underlying concepts will be used in the study?
- What key terms will require selection among varying definitions?
- What kind of data will be collected?
- What variables can and should be measured, controlled, or randomized?
- What data collection method (e.g., interview, sample survey, or field observation) is most appropriate?
- What should be the size of the pool of human subjects? Will there be subsamples?
- What time period for observation is appropriate?
- What tools and techniques will be used for data collection and analysis?
- What measures will provide an answer to the research question?
- What confirmatory testing is appropriate for results?

Conceptualizing complex phenomena—that is, human behavior—complicates answering these questions. Compared to other sciences, researchers in the behavioral sciences will be limited in what overarching theoretical frameworks, universal laws, and quantitative and predictive theories they can rely on<sup>118</sup>. And general theories about human behavior may lack the specificity to make exact predictions<sup>119</sup>. The complexity of the study phenomena diminishes the specificity of a hypothesis that can be tested and conclusions that can be drawn<sup>120</sup>. This is important because the basic convention of “good science” is that theory drives research. But the complexity of human behavior undermines “specificity of the theories and hypotheses that guide research”<sup>121</sup>. Further complicating the matter is that relevant behavioral constructs are often defined differently across scientific literature.

It is also important to note that study conditions can influence how subjects behave. For instance, people tend to behave differently if they perceive they are being observed<sup>122</sup>. And different standards in sampling human subjects, when representation is a concern, necessitate special techniques<sup>123</sup>. It may be impossible to control all stimulus for human behavior, and thus researchers must decide what factors they have to account for.

Obviously, the complexity of the phenomena that behavioral scientists research necessitates extra care in setting up a framework. It may help to start this challenging process of constructing a research study with defining what *scientific rigor* will look like. Is the study prioritizing replicability? Predictability? Proximal determinants? Establishing a statistically significant causal relationship? For example, some researchers in the behavioral sciences choose to develop theories and models that only apply to particular contexts and entities, lacking any promise of generality<sup>124</sup>. It is important to clarify at the outset how abstract/precise/comprehensive/invariable/whatever the findings need to be.

Without the strict standards present in some sciences, researchers in the behavioral sciences define *to a degree* on what terms the study will succeed. In this way, advisors, reviewers, editorial boards at journals, and other researchers within the behavioral sciences act as a system of checks and balances on acknowledged scientific rigor, rather than the explicit rules that may be laid out in a topic like chemistry or in the most quantifiable of behavioral sciences research.

### Applying Sound Research Practices

This field of science does not have a singular set of precise measures, quantitative theories, exacting predictions, or uniform methods, as other sciences may have. But these four following categories are a reliable tool for simplification<sup>125</sup>:

1. Experimental—Manipulating a small number of variables in a constant, randomized, or otherwise controlled setting.
2. Survey—Pulling and examining data from censuses, sample surveys, and longitudinal studies.
3. Comparative—Retrieving and interpreting evidence recorded from events in varying times or places.
4. Ethnographic—Observing, interviewing, and/or participating with the study subjects using intensive and direct contact.

<sup>118</sup> <https://www.sciencedirect.com/science/article/pii/S0732118X23000077>

<sup>119</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>120</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546485/>

<sup>121</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>122</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>123</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546485/>

<sup>124</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>125</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546485/>

Experiments are often less ideal for complex phenomena because of the possibilities for confounding variables<sup>126</sup>. Variables and interrelations in human behavior can also make statistical analysis less ideal. So the other, qualitative data collection methods seem to be more sensitive to a study phenomena's context<sup>127</sup>. Like other scientists, behavioral sciences researchers do use quantitative methods such as experiments, scaled surveys, statistical analysis, mathematical modeling, classification, mapmaking, examination of physical traces, and careful examination of physical objects. But meaning-based, qualitative measures (e.g., participant observation, interviewing, textual analysis, focus groups, observational studies, fieldwork, intuition/experience, surveying, ethnography, and textual analysis) are also often necessary to capture complex variables<sup>128</sup>.

For quantitative, qualitative, and mixed methods research, the American Psychological Association's [Journal Article Reporting Standards](#)<sup>129</sup> are useful reference guides that can be applied across the behavioral sciences. Consider the following three resources as routine reference materials in specifying a project's research methods, as well as a useful starting point for students unfamiliar with what reporting methods to use based on the characteristics of their target population/collected data. (That is, knowing what will be expected when later reporting on a project can help a student researcher in initially shaping research methods.)

1. [Quantitative research design](#) (JARS-Quant) provides detailed guidance for reporting primary quantitative research, experimental designs/nonexperimental designs (including random assignment, nonrandom assignment, clinical trials, and nonexperimental designs), special designs (i.e., longitudinal studies, *N-of-1* studies, and replication studies), analytic methods (i.e., structural equation modeling and Bayesian statistics), and meta-analyses<sup>130</sup>. APA PsycNet offers content further elaborating on appropriate contexts for these design methods in a [task force report](#)<sup>131</sup>.
2. [Qualitative research design](#) (JARS-Qual) provides detailed guidance for reporting primary qualitative research and meta-analyses<sup>132</sup>. The seventh edition of APA's [Publication Manual](#) also includes guidance on qualitative studies, including reporting standards, data considerations, and a description of case studies as a type of qualitative article<sup>133</sup>. A second [task force report](#) can help new researchers learn more about qualitative methods and rhetorical distinctions, including terms for the following, third set of guidelines<sup>134</sup>.
3. [Mixed methods research design](#) (JARS-Mixed) should be used in conjunction with the two preceding guidelines.

(Students unfamiliar with terms describing the research methods used in the behavioral sciences can also rely on the [APA Style JARS supplemental glossary](#)<sup>135</sup>.)

Researching humans involves the additional research practice of selecting a sampling method for engaging human subjects. Identifying the appropriate population requires thoughtful consideration. It is important for researchers to base their sampling targets on scientific aims rather than convenience. One of the first challenges often experienced by students conducting research with human subjects is how hard it can be to secure participants and just how large a representative sample needs to be. When selecting between probability and non-probability sampling methods, it is important to account for the population's characteristics and accessibility among other study constraints in order to successfully engage the appropriate test subjects. Factors to account for in selecting a sampling method include: types of design, signal frequency, sample size and power, survey questions, compensation, recruitment strategies, running the study, data handling, making the most of experience sampling studies, and availability<sup>136</sup>. Common sampling methods follow<sup>137</sup>.

- Simple random—When the entire population is accessible and identifiable
- Stratified random—When the entire population is accessible, is identifiable, and can be divided into subgroups based on demographics
- Interval/Systematic random—When researchers select subjects to include based on a systematic rule, using a fixed interval
- Multistage/Clustered random—When listing all potential subjects is not feasible due to the size of the population, so potential subjects are divided by geographic location
- Convenience—When subjects are enrolled because of their availability and accessibility (widely used in clinical research)
- Judgmental—When researchers select subjects assuming specific characteristics for the sample
- Snow-ball—When the population can't be located in a specific place, so found subjects are asked for access to additional subjects with the same characteristics

<sup>126</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>127</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>128</sup> [https://uk.sagepub.com/sites/default/files/upm-assets/110611\\_book\\_item\\_110611.pdf](https://uk.sagepub.com/sites/default/files/upm-assets/110611_book_item_110611.pdf)

<sup>129</sup> <https://apastyle.apa.org/jars>

<sup>130</sup> <https://apastyle.apa.org/jars/quantitative>

<sup>131</sup> <https://psycnet.apa.org/fulltext/2018-00750-002.html>

<sup>132</sup> <https://apastyle.apa.org/jars/qualitative>

<sup>133</sup> <https://www.apa.org/pubs/books/publication-manual-7th-edition-paperback> (More on the Publication Manual in Chapter 9.)

<sup>134</sup> <https://psycnet.apa.org/fulltext/2018-00750-003.html>

<sup>135</sup> <https://apastyle.apa.org/jars/glossary>

<sup>136</sup> <https://www.apa.org/education-career/training/secure/science-training-introduction-sampling-methods>

<sup>137</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC5325924/>

### Testing Results for Validity

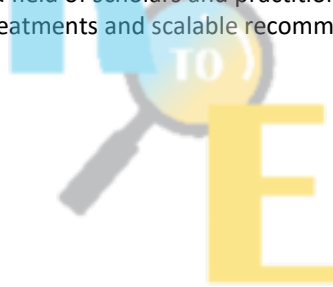
Just as in other fields, *validity* in the behavioral sciences refers to whether the research measures what it aims to and if the research question is accurately answered<sup>138</sup>. That validity can be measured in various terms<sup>139</sup>:

- Test validity is an empirical demonstration that a measure can measure what it was intended to measure.
- Construct validity is test validity that includes empirical/theoretical support for the interpretation of the construct.
- Face validity is a subjective measure of whether a measure appears to address its intent.
- Discriminant validity is the degree a quality measure correlates with other tests designed to measure theoretically different concepts.
- Criterion validity is a measure's ability to meet an accepted standard or rule.
- Predictive/Empirical validity is the ability of the measure to predict scores.
- Convergent validity is the degree that multiple measures correlate.

When testing results for validity, student researchers need to ask good questions in the context of their study's scientific aims. Can conclusions be drawn in terms of correlation, cause and effect, or trends? What are the most pertinent variables? Can the relation between variables be estimated? How certain are estimates? How can data analysis help to reduce any uncertainty in the findings<sup>140</sup>?

Student researchers should carefully approach the topics addressed in the two preceding sections: constructing a study framework and implementing sound research practices. To achieve external validity, student researchers should involve a study population that reflects the population they are making insights about<sup>141</sup>.

These considerations reinforce that the complexity of human behavior is mirrored in the complexity of researching that behavior. Specific studies may contribute to our understanding of people, even without reducing people to some invariable formula. (There is no behavioral equivalent of  $E = mc^2$ .) Many working within the field of behavioral sciences contend that the value of this research is evident when examining output as a whole<sup>142</sup>. Thoughtful research creates a snowball effect, contributing to and strengthening the interdisciplinary study of human behavior. And meta-analyses, systematic analyses, and landscape analyses synthesize researching finds for commonalities. Researchers are feeding a field of scholars and practitioners that leverage implementation science methods to translate researching findings into applicable treatments and scalable recommendations<sup>143</sup>.



---

<sup>138</sup> <https://www.uoguelph.ca/hftm/book/export/html/2129>

<sup>139</sup> <https://mmsshub.cms.gov/measure-lifecycle/measure-testing/evaluation-criteria/scientific-acceptability/validity>

<sup>140</sup> <https://www.ncbi.nlm.nih.gov/books/NBK546485/>

<sup>141</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC6188693/>

<sup>142</sup> <https://bidenwhitehouse.archives.gov/ostp/news-updates/2024/05/15/blueprint-for-the-use-of-social-and-behavioral-science-to-advance-evidence-based-policy-making/>

<sup>143</sup> <https://bidenwhitehouse.archives.gov/ostp/news-updates/2024/05/15/blueprint-for-the-use-of-social-and-behavioral-science-to-advance-evidence-based-policy-making/>

# Chapter 9: Writing a Behavioral Sciences Research Report

How is scientific reporting different in the behavioral sciences?

Although the anatomy of a journal article remains the same<sup>144</sup>, the abstracts and texts tend to be longer<sup>145</sup>. And for good reason. More complex study phenomena require a longer word count to explain. There is more context to spell out, variables to examine, and conditional theories to qualify. In lieu of the precise measures, exacting predictions, uniform methods, and other forms of standardization that other sciences can quickly refer to, researchers in the behavioral sciences must take greater care in justifying their hypotheses, as well as noting competing definitions, addressing inconsistencies, and making sense of multifactorial results<sup>146</sup>.

## APA WRITING PRINCIPLES

Clarity	Precision	Inclusion
Use language others will understand. Follow spelling and grammar conventions. Check for and fix misplaced or missing ideas.	Choose specific nouns and verbs. Avoid the editorial "we" to refer to all people. Provide exact numbers and statistics rather than approximations.	Describe people with dignity and respect. Focus on relevant characteristics. Call people what they call themselves

### The APA's Style Guide

Fortunately, there is clear, widely accepted guidance for writing a scientific report in this field. Researchers in the behavioral sciences overwhelmingly turn to the American Psychological Association's style guide. The *Publication Manual of the American Psychological Association*<sup>147</sup> is critical reading for aspiring researchers who will need to know how to properly structure their research study and then credibly report their conclusions.

By detailing guidance for a written language, style guides provide clarity to readers through the standard application of conventions. In research, style guides are critical to clearly citing and making sense of sources. Through a consistent structure, readers can follow ideas and locate information. Researchers are able to establish credibility by upholding standard guidelines, spelling out support for their ideas, giving credit to other researchers and authors, and organizing arguments in an efficient, easy-to-follow way.

There are a handful of frequently used style guides in the United States including the *Associated Press Stylebook*, the Modern Language Association's *MLA Style Manual*, and the *Chicago Manual of Style*. Although the MLA style guide is commonly used in schools, student researchers would be well-served to learn APA style, which influences research output across the disciplines of the behavioral sciences.

With about 160,000 members, APA is the leading scientific and professional organization focused on psychology in the United States. Representing researchers, educators, clinicians, consultants, and students, the organization's mission is to promote the advancement, communication, and application of psychological science and knowledge to benefit society. It is not only an authoritative voice for psychology but also a leading voice on conducting research—especially research with human subjects.

What sets the APA's *Publication Manual* apart? The APA's style guide is authoritative and easy to reference. It also has both a long-standing reputation and is frequently updated to maintain its relevance.

APA style was first set in 1929 to help codify the components of scientific writing and help ease reading comprehension<sup>148</sup>. The *Publication Manual* has since grown in scope and detail to provide guidance on headings, tables, figures, language, and tone. It sets standards for how content is organized, how to convey content in a scholarly and concise way, and how to prepare a manuscript for publication. Currently in its 7<sup>th</sup> edition, the 2020 *Publication Manual* includes guidance on inclusive language and examples for how to cite a social media post, among other updates. New standards such as [citing ChatGPT](https://apastyle.apa.org/blog/how-to-cite-chatgpt)<sup>149</sup> and [APA journals' policy regarding the use of generative AI](https://www.apa.org/pubs/journals/resources/publishing-tips/policy-generative-ai)<sup>150</sup> are posted online between edition releases.

<sup>144</sup> That is, sections include: title and author, abstract, introduction, method, results, discussion, tables and figures, and reference list

<sup>145</sup> <https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0066938&type=printable>

<sup>146</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC7859482/>

<sup>147</sup> [https://apastyle.apa.org/?utm\\_campaign=apa\\_publishing&utm\\_medium=display\\_google&utm\\_source=books&utm\\_content=apa-style\\_brand\\_search\\_campaign\\_grant\\_10202023&utm\\_term=brand\\_adgroup&gad\\_source=1&gclid=CiwKCAiAzPy8BhBoEiwAbnM9O8l7W9fJt11MAg9Zf1jQlrSstvGi-G8mdWyoV3LtCjgNW6WFSiOiORoCEAgQAvD\\_BwE](https://apastyle.apa.org/?utm_campaign=apa_publishing&utm_medium=display_google&utm_source=books&utm_content=apa-style_brand_search_campaign_grant_10202023&utm_term=brand_adgroup&gad_source=1&gclid=CiwKCAiAzPy8BhBoEiwAbnM9O8l7W9fJt11MAg9Zf1jQlrSstvGi-G8mdWyoV3LtCjgNW6WFSiOiORoCEAgQAvD_BwE)

<sup>148</sup> <https://apastyle.apa.org/about-apa-style>

<sup>149</sup> <https://apastyle.apa.org/blog/how-to-cite-chatgpt>

<sup>150</sup> <https://www.apa.org/pubs/journals/resources/publishing-tips/policy-generative-ai>

The application of APA style has spread across the behavioral sciences, as well as into business, health care, humanities, natural sciences, and more. APA style has been adopted by peer-reviewed journals covering many disciplines, replacing their own in-house style guides. (That includes 319 journals published by Wiley and all 90 peer-reviewed journals published by APA itself<sup>151</sup>.) The APA citation style may be the most widely used style in the world. And more than 15 million copies of the *Publication Manual* have been sold since 1952, with the manual officially translated into 13 languages<sup>152</sup>.

This wide popularity among scientific studies helps researchers and their readers.

For researchers, the APA style guide helps establish credibility. It encourages researchers, as report authors, to fully disclose essential information, logically order ideas, consistently instill organization, and appropriately credit sources. Authors can show adherence to widely accepted ethical guidelines and research protocols. And they can format and distill data in a consistent way.

For readers, the APA style guide ensures content leverages a familiar organizational approach and formatting that enables scanning for pertinent information and hastens comprehension. Uniformity and consistency enable readers to focus on ideas rather than having to decipher formatting<sup>153</sup>. And because many readers are fellow researchers, the APA style guide enables readers to potentially replicate a study, more seamlessly collaborate, and conduct meta-analyses.

How does the APA's *Publication Manual* guide research? The APA style guide focuses on scholarly writing, specifically addressing the preparation of manuscripts for publication in a journal and student papers. It advocates for critical thinking about research<sup>154</sup>. With this focus, it provides guidance on:

- the ethics of authorship,
- selecting and evaluating sources,
- leveraging library resources such as PubMed and EBSCO databases,
- formatting and labelling sections and tables,
- citing sources,
- using appropriate terminology and inclusive language, and
- shaping content to be accurate and impactful.

APA notes: "The *Publication Manual* does not cover general rules explained in widely available style books and examples of usage with little relevance to the behavioral and social sciences"<sup>155</sup>. For general guides, APA recommends *Words Into Type* and the *Chicago Manual of Style*. APA style largely aligns with these sources.

Notably, the *Publication Manual* includes the aforementioned APA Style Journal Article Reporting Standards, or JARS. Again, these standards address what to include in reporting for quantitative, qualitative, and mixed methods research, with the aim of enhancing the scientific rigor of peer-reviewed journal articles. JARS standards can shape research studies from the outset to ensure credible findings, as well as guide what to report in scholarly papers. JARS includes unique standards for:

- [Quantitative research \(JARS–Quant\)](#)—for research reported numerically<sup>156</sup>
- [Qualitative research \(JARS–Qual\)](#)--for reports using descriptive data across a range of methods (e.g., phenomenological, narrative, thematic, and discursive methods)<sup>157</sup>
- [Mixed methods research \(JARS–Mixed\)](#)--for reports including quantitative and qualitative research<sup>158</sup>

Ultimately, the *Publication Manual of the American Psychological Association* facilitates the communication of science. Student researchers would benefit from better understanding APA style from the outset of their studies in order to improve the clarity, completeness, and credibility of their research reports.

---

<sup>151</sup> <https://lumivero.com/resources/blog/apa-the-most-popular-citation-style-in-the-world/#:~:text=The%20APA%20citation%20style%20just,total%20of%2015%20million%20copies>

<sup>152</sup> <https://www.apa.org/news/press/releases/2019/08/publication-manual>

<sup>153</sup> <https://apastyle.apa.org/about-apa-style>

<sup>154</sup> <https://apastyle.apa.org/about-apa-style>

<sup>155</sup> <https://apastyle.apa.org/about-apa-style>

<sup>156</sup> <https://apastyle.apa.org/jars/quantitative>

<sup>157</sup> <https://apastyle.apa.org/jars/qualitative>

<sup>158</sup> <https://apastyle.apa.org/jars/mixed-methods>

## APA Resources for Students

It takes time to learn APA style. Given its wide use in college and professional settings, students benefit from gaining familiarity in high school. (This can also benefit students pursuing the AP Capstone diploma and taking standardized tests such as the SAT and ACT<sup>159</sup>.) The following APA links can help students dive in.

- [Publication Manual of the American Psychological Association, Seventh Edition \(2020\)](#)<sup>160</sup>
- [APA Style for Beginners](#)<sup>161</sup>
- [APA Style Tutorials and Webinars](#)<sup>162</sup>
- [Mastering APA Style Student Workbook](#)<sup>163</sup>
- [Academic Writer](#) (a self-paced learning platform to help students write research reports for publication)<sup>164</sup>
- [Journal Article Reporting Standards](#)<sup>165</sup>
- [APA Anatomy of a Journal Article](#)<sup>166</sup>
- [APA Style Student Paper Checklist](#) (beginner's version)<sup>167</sup>
- [Sample Papers on APA Style Website](#)<sup>168</sup>
- [Brief Guide to Bias-Free & Inclusive Language](#)<sup>169</sup>
- [APA Dictionary of Psychological Terms](#)<sup>170</sup>

Let's end this section with some solid writing tips from the APA for scientific reporting. These are not specific to researching human behavior but did originate in the context of editors reviewing psychological research. APA writing tips<sup>171</sup>:

- *Eliminate wordiness, redundancy, evasiveness, and circumlocution (i.e., writing in circles).*
- *Vary sentence length. Break up paragraphs longer than one double-spaced page into shorter paragraphs.*
- *Use transitions to smoothly connect sentences, paragraphs, and ideas.*
- *Use a professional tone and professional language. Do not use jargon, contractions, colloquialisms, or creative literary devices.*
- *Use verb tenses consistently across sentences and paragraphs. Describe past research in the past or present perfect tense (e.g., "Researchers found" or "Researchers have found," not "Researchers find").*
- *Use the active voice as much as possible to make your writing more direct. The passive voice is allowed when you need to focus on the recipient of an action, but don't overdo it.*
- *Ensure verbs agree in number with their subjects.*
- *Use first-person pronouns to describe your work and personal reactions. Use "I" for a solo paper; use "we" for a group paper.*
- *Use the singular "they" to refer to a hypothetical person or when gender is unknown; otherwise, use a person's self-identified pronouns.*

## Writing Inclusively

Now, let's drill into a specific concern of the APA guidelines for scientific reporting that centers on the behavioral sciences: writing inclusively—about the human subjects of a study and/or about people of concern to a research question, be it entire populations and specific categories of individuals.

Check out APA's [Equity, Diversity, and Inclusion: Inclusive Language Guide](#), Second Edition, which is available free online.

Researchers understand how important it is to use a common vocabulary in order to establish a shared understanding. In overcoming historical biases in presenting research, the APA has established inclusive language guidelines regarding the utilization of the most contemporary language based on psychological research<sup>172</sup>. Like a style guide or a dictionary, APA's [Equity, Diversity, and Inclusion: Inclusive Language Guide](#) can be used as a reference resource to refer to for specific usage concerns. (it's also incredibly insightful to just read in its entirety.) It can help researchers avoid offensive/outdated terms and use terms in generally agreed-upon ways within the behavioral sciences field. These recommendations account for Chapter 5 guidelines in APA's main style guide to

<sup>159</sup> <https://apastyle.apa.org/beginners>

<sup>160</sup> <https://apastyle.apa.org/products/publication-manual-7th-edition>

<sup>161</sup> <https://apastyle.apa.org/beginners>

<sup>162</sup> <https://apastyle.apa.org/instructional-aids/tutorials-webinars>

<sup>163</sup> <https://apastyle.apa.org/products/mastering-apa-style>

<sup>164</sup> <https://www.apa.org/pubs/databases/academic-writer>

<sup>165</sup> <https://apastyle.apa.org/jars>

<sup>166</sup> <https://apastyle.apa.org/instructional-aids/anatomy-journal-article.pdf>

<sup>167</sup> <https://apastyle.apa.org/instructional-aids/beginner-student-paper-checklist.pdf>

<sup>168</sup> <https://apastyle.apa.org/style-grammar-guidelines/paper-format/sample-papers>

<sup>169</sup> <https://apastyle.apa.org/instructional-aids/inclusive-language.pdf>

<sup>170</sup> <https://dictionary.apa.org/>

<sup>171</sup> <https://apastyle.apa.org/instructional-aids/beginner-student-paper-checklist.pdf>

<sup>172</sup> <https://apastyle.apa.org/blog/inclusive-language-guidelines>

ensure bias-free language and can be used as a supplement to the APA's primary publication manual. Equity, diversity, and inclusion (EDI) content includes<sup>173</sup>:

- *definitions related to issues of power and equity that cut across various social identities*
- *differences between person-first and identity-first language with numerous examples*
- *identity-related terms that cover age; disability status; race, ethnicity, and culture; sexual orientation and gender diversity; and socioeconomic status [and] ...*
- *how to avoid cultural appropriation, pejorative language, and the use of casually offensive language in conversation*

The underlying principle of the EDI guide is that researchers should call people what they call themselves<sup>174</sup>. To develop the guidelines, the APA consulted well-vetted research findings and experts who have studied the psychology behind discrimination, marginalization, and the experiences of varying populations<sup>175</sup>. Recommendations are based on widely recognized research regarding "bias, identity development, privilege, and the psychological impact of various -isms (i.e., ageism, ableism, classism, homophobia, racism, and sexism) at the individual, interpersonal, institutional, and structural levels"<sup>176</sup>.

Students can expect the EDI guide to be regularly updated with new editions (and online updates in between) to reflect evolving language and new terminology. For example, the second edition included the following changes<sup>177</sup>:

- A section addresses how bias and discrimination against a person's size and weight can lead to distress and suffering.
- More inclusive terminology on pregnancy addresses how gender intersects with the medical condition of pregnancy and how experience is shaped by gendered expectations.
- Neurodiversity gained its own section, with expanded terminology distinguishing *neurodiversity* and *neurodivergence*.
- New research on racism better addresses the mental health impacts of structural and systemic racism.
- New material regarding casual ableism focuses on ableist terms in everyday language.

A second resource relevant to researchers within the behavioral sciences is APA's [Journal Article Reporting Standards for Race, Ethnicity, and Culture](#) (JARS-REC)<sup>178</sup>. Whereas the other three, aforementioned JARS address specific types of research<sup>179</sup>, the JARS-REC is expected by the APA to be used in conjunction with any of those three when conducting research in psychology (although also widely adopted across the behavioral sciences). Historically, the APA has found, psychological research has overlooked how race, ethnicity, and culture influence research, as well as how inequalities affect training practices, funding, publishing, and recognition in the research profession<sup>180</sup>. Compiled by experts using research-based findings, JARS-REC is a counterpoint to color- and power-evasive patterns in all stages of research.

Check out APA's [Journal Article Reporting Standards for Race, Ethnicity, and Culture](#), which is available free online.

JARS-REC addresses how race, ethnicity, and culture are discussed in scientific reporting and provides concrete guidance on how to consider the implications of these subjects in every stage of a research study, including drafting a manuscript. This includes standards for sample descriptions, citations, and generalizability, as shown by the following JARS-REC recommendations<sup>181</sup>:

- *Given the variations in the way race is defined in countries around the world, authors should clarify the relevant national and cultural context for the research study. Definitions of race and ethnicity should be articulated clearly. Authors should treat the concept of culture as distinct from race and ethnicity.*
- *Racial and ethnic groups and categories are not universal. Terms are used differently around the world. Authors should use racial and ethnic labels and categories that are congruent with the local usage practices and that resonate with sample participants.*
- *Language usage for racial and ethnic groups changes as norms and practices for a given community evolve.*
- *The history of psychological research on people of color has been largely that of stigmatization, marginalization, and erasure. Research questions often centered on identifying and describing "problems" in people of color. Historically, reviewers often required study designs that use White Americans as a comparison group for people of color regardless of the research question (i.e., the deficit model approach). Current best practices involve ensuring that (a) research questions are grounded in an appropriate historical and cultural context and (b) the research questions appropriately map onto research*

<sup>173</sup> <https://apastyle.apa.org/blog/inclusive-language-guidelines>

<sup>174</sup> <https://apastyle.apa.org/blog/inclusive-language-guide-second-edition>

<sup>175</sup> <https://apastyle.apa.org/blog/inclusive-language-guidelines>

<sup>176</sup> <https://apastyle.apa.org/blog/inclusive-language-guidelines>

<sup>177</sup> <https://apastyle.apa.org/blog/inclusive-language-guide-second-edition>

<sup>178</sup> <https://apastyle.apa.org/jars/race-ethnicity-culture>

<sup>179</sup> JARS for quantitative research ([JARS-Quant](#)), qualitative research ([JARS-Qual](#)), and mixed-methods research ([JARS-Mixed](#))

<sup>180</sup> <https://apastyle.apa.org/blog/race-ethnicity-culture-reporting-standards>

<sup>181</sup> <https://apastyle.apa.org/jars/rec-table-1.pdf>

*designs. Researchers should carefully select and implement theoretical framing to ensure that racial, ethnic, and cultural stereotypes are not reified. Strengths-based models should also be considered where appropriate.*

- *For authors who are researching health equity and other forms of equity, consider using the CONSORT-Equity 2017 extension and elaboration for better reporting of health equity in randomized trials.*

### Getting Published

With a manuscript prepared in these terms, the process of get a study published in a peer-reviewed journal is the same as getting published in other sciences. Again, I recommend reading [Research to Empower: A Vibrant Guidebook for Young Students](#) by Research to Empower’s founder and CEO Grace Liu for general research advice to K-12 students.

#### General Behavioral Science Peer-Reviewed Journals

- [Journal of Contextual Behavioral Science](#)
- [Current Opinion in Behavioral Sciences](#)
- [Journal of Experimental Analysis of Behavior](#)
- [Current Research in Behavioral Sciences](#)
- [Behavioral Science and Policy](#)

For aspiring behavioral scientists, I also recommend becoming familiar with what good research looks like in their discipline of choice. This book has provided examples of respected journals, as well as links to student memberships in professional associations that can help a student become fluent in their chosen area of study. Becoming well-read in commonly cited research studies will help students:

- Get a sense of what *good* looks like
- See examples of researchers competently writing about human subjects and constructing studies on complex topics
- Gain context for pressing topics of concern within the discipline
- Start to connect the dots in terms of the interdisciplinary nature of the behavioral sciences, as well as areas of specialization
- Understand what journals (and specifically, editorial boards) to target with a ready manuscript—or how to write with a specific journal in mind

Students researchers in the behavioral sciences also benefit from reviewing APA’s support tools for getting published:

- [APA Journals™ Publishing Resource Center](#)
- [APA Author resource center](#)
- [APA Reviewer Resource Center](#)
- [APA Editor resource center](#)



# Chapter 10: Behavioral Sciences Undergraduate Programs

Student researchers who aspire to become behavioral scientists have some unique considerations in selecting which undergraduate programs to apply to.

Relative to other sciences, the behavioral sciences lack uniformity in curriculum and focus across universities<sup>182</sup>. For instance, when cognitive science is actually offered as an undergraduate degree option at a university, it may be housed with neurology or computer science or in the college of social sciences and thus have very different course offerings. Some schools offer the choice of earning an economics degree as either a bachelor of arts or a bachelor of science, with changes to how many math and data analysis courses are required. And anthropology undergraduate degree programs can vary greatly depending on which subfields/specializations the university has invested in distinguishing itself in. Student researchers looking for the right undergraduate program should act like well-informed shoppers.

Of special importance to aspiring behavioral scientists is the access undergraduates have to research opportunities. The answer requires scratching beneath the surface of college marketing brochures to find out what's really happening. Large universities will tout having a variety of labs and armies of research teams to join. Liberal arts colleges<sup>183</sup> will boast of providing research opportunities that incoming college students don't have to compete with graduate students to participate in. Rather than accept this marketing copy at face value, aspiring behavioral scientists should conduct their own research on the matter. The NIH reports: "In the behavioral sciences, traineeships and fellowships support only a small proportion of graduate students," so these students are often first in line (i.e., ahead of undergrads) to be employed by the university as research assistants<sup>184</sup>.

Explore the following considerations:

- Does the school have a research activity designation? The Carnegie Classification of Institutions of Higher Education has a designation specifically concerning the level of research activity conducted within a college or university<sup>185</sup>. R1 denotes the highest designation, with institutions spending at least \$50 million on research and development (R&D) and producing at least 70 research doctorates a year. R2 denotes the institutions spends at least \$5 million on R&D and produces at least 20 research doctorates a year. And the average college/university spends about \$2.5 million a year on R&D. Greater investment is a clear indicator of greater opportunities.
- What qualifications are necessary for undergraduates to join graduate/faculty research teams? Look at job boards/postings within the school for open research positions. How common or competitive is it for undergraduates to join faculty and graduate students in their ongoing research? Can any interested student apply? Are research positions restricted to juniors and seniors? Are there really only a couple slots open a year? Or is there an entrenched, flourishing research culture?
- Is independent research part of the upper-level curriculum graduation requirements for the major? That is, is the research course listing actually only a rare possibility for the student who has endeared themselves to a particular professor who is willing to spend the extra, unpaid time to be a study advisor? Or does the program expect all/most upper-level students to conduct independent research, with the necessary support structures of courses, faculty, funding, and lab space already in place?
- Must undergraduates complete a thesis to graduate? Although this is often just an option for those students looking to graduate with honors, a thesis program can provide structure and accountability to gaining independent research experience. Aspiring researchers may seek out programs with senior research projects expected to extend across two semesters, so that they may develop research worthy of publishing or placing well in graduate school.
- Does the program offer courses with a strong research component? Whereas it is relatively traditional for the behavioral sciences to require a class in statistics, what other research foundations are taught for credit hours?
- Does the degree require—or at least provide additional space in credit hours—for students to gain a broad understanding of the core disciplines of the behavioral sciences? The NIH states: "Undergraduate education in the behavioral sciences must include a broad background of work in a number of disciplines in order for graduate study to be effective. Many undergraduate students do not recognize this and must augment their work at the graduate level with additional work in biology, mathematics and statistics, computer science, or in such fundamental areas as philosophy, chemistry and biochemistry, or history"<sup>186</sup>.
- Does the program offer full-time research opportunities for undergraduates in the summer? How large is this program, and how many students participate each year? Does it provide a stipend? Does the program offer support in securing students summer field work?

<sup>182</sup> <https://www.sciencedirect.com/science/article/pii/S0732118X23000077>

<sup>183</sup> Colleges only offer undergraduate degrees. Universities also offer graduate programs.

<sup>184</sup> <https://www.ncbi.nlm.nih.gov/books/NBK222610/>

<sup>185</sup> <https://carnegieclassifications.acenet.edu/carnegie-classification/research-designations/>

<sup>186</sup> <https://www.ncbi.nlm.nih.gov/books/NBK222610/>

- Does the campus conduct research fairs? And do students participate at science fairs for undergraduates? How often do students get author credit on published papers? Do students get the opportunity to present at conferences?
- Do advisors for the program have a sort of career ladder for aspiring students to progress throughout their four years in amassing more involved research experience? Are supports such as graduate mentors readily available? Or does the program expect students to navigate opportunities on their own?
- What is the program's reputation within its discipline? Is it well recognized? Do its students often go onto the graduate programs for the specialization you're interested in? Even though the behavioral sciences have lagged behind other sciences in accruing post-graduate degrees, the gap in attendance to doctorate programs is decreasing<sup>187</sup>. Check out [Higher Ed Data Stories](#) to reference doctorate program feeder rates<sup>188</sup>.

To answer these questions, college tours are invaluable. Both speaking to tour guides and students can reveal ease of securing research positions at a certain institution. But even if a student cannot travel to candidate programs, they can still approach admissions to request contact information to ask specific questions of a major.

It is also important to consider what you personally want out of your college experience! If you're hoping for plenty of quality, one-on-one time with a professor, then you should look at smaller liberal arts colleges. If you're hoping to work in a large lab under high-profile faculty, then you should look at R1 universities. There's also the option of looking at small cross-disciplinary research programs within large universities, such as the Plan II major at University of Texas at Austin<sup>189</sup>. Or do your passions within research change a lot? Do you love tackling complex, cross-disciplinary questions? Or do you like the freedom to switch from one specialization to another? If so, no worries. Earning a bachelor's degree is a great time to explore. Look for a program with enough flexibility and varied resources for you.

I have confidence you'll find the right program for you. If you are motivated enough to read this, then you are likely the type of student who will tap into the research opportunities at whatever undergraduate program you land at. Your sense of agency is your most critical success factor. Continue being led by your curiosity and passion for unearthing new insights. This will not only serve you well in your career as a behavioral scientist but also help to further cultivate the behavioral sciences field into a rich resource of sound research.



<sup>187</sup> <https://www.ncbi.nlm.nih.gov/books/NBK22624/>

<sup>188</sup> <https://www.highereddatastories.com/2024/12/doctoral-recipients-by-undergraduate.html>

<sup>189</sup> <https://liberalarts.utexas.edu/plan2/>