

Sex Differences: Summarizing More Than a Century of Scientific Research

By Lee Ellis, Scott Hershberger, Evelyn Field, Scott Wersinger, Sergio Pellis, David Geary, Craig Palmer, Katherine Hoyenga, Amir Hetsroni, and Kazmer Karadi. Psychology Press (Taylor & Francis Group), New York, 2008, 972 pp., \$210.00

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In this volume, Ellis et al. have compiled a massive compendium of citations for reported sex differences. References cited are located on a compact disc that accompanies the book. Ellis et al. placed few constraints on the research they report, including human and nonhuman animal studies, as well as all age groups. Approximately 18,000 studies are cited, some of which report more than one sex difference, for a total of about 30,000 citations. These are condensed into 1,920 tables, organized with the intent of updating as new studies are published.

Tables are divided into rows by the direction of the sex difference, or no significant difference, and into columns by age: “infant” (in humans, <1 year), “toddler” (in humans, 1–2 years), “early childhood” (in humans, 3–5 years), “childhood” (in humans, 6–12 years), “adolescent” (in humans, 13–18 years), and “adult” (in humans, 19 years or older). Citations are categorized within cells according to seven world regions (Africa, Asia, Europe, Latin America, Middle East, North America, and Oceania). Nonhuman species, which comprise 10% of the citations, are listed by species and approximate age in human years. Before each table is a brief introduction to the variables addressed in it.

The book is organized into 13 chapters. Chapter 1, “Basic Biological Factors,” includes sex ratios at birth, weight, and sizes and functioning of various anatomical and physiological organs. Chapter 2, “The Brain and Biochemistry,” summarizes findings on neurological functioning, neuroanatomy, neurochemistry, hormones, neurotransmitter receptors, and so forth. Chapter 3, “Health and Illness Factors,” includes overall health and illness as determined by use of health care services

and self-reported healthiness, mortality and life span, and a breakdown of specific illnesses and injuries. Chapter 4 covers “Perceptual, Motor, and Emotional Factors,” including odor discrimination, visual and pain perception, motor coordination, and emotions.

Chapter 5 covers “Intellectual, Cognitive, Self-Concept, and Mental Health/Illness Factors.” This comprises academic differences, intellectual development and decline over the life span, language reasoning, spatial ability, and comparisons of various types of knowledge, such as knowledge of sex, science, social science, arts, and humanities. This chapter also incorporates learning and memory, sleep related phenomena, self-reflection, and self-assessment comparisons. It concludes with mental illnesses, such as depression and schizophrenia, and mental health related behaviors, such as suicide and drug and alcohol abuse.

“Preferences, Interests, Attitudes, Beliefs, and Intentions” are covered in Chapter 6, including sensory preferences (e.g., for colors or smells), academic interests, social interactions, sports and exercise, sex-related interests and desires, and media, hobby, work, and career interests. Chapter 7 covers responses to drugs, stress, and therapeutics. This includes perinatal effects of drugs and stress, responses to drugs in general, responses to specific drug types, such as anesthetics, alcohol, sedatives, stimulants, antidepressants, antipsychotics, and stress and pain responses.

Chapter 8 reviews personality and general behavior, including boredom and curiosity, religious and sex role behavior, and health-related behavior, such as exercise activity and diet. Social behavior is covered in Chapter 9, including conformity, competitiveness, aggression, physical and social contact, altruism, communication, play, and mating. Consuming and individual institutional interactions are reviewed in Chapter 10, including acquiring and consuming drugs and criminal behavior. Chapter 11 deals with stratification and work-related behavior, including

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hierarchies and resource control, territory and spacing behavior, and vocation. Chapter 12 deals with attitudes and beliefs surrounding gender, physiological and cognitive responses to others based on sex, social treatment by others, victimization, and portrayals in the mass media.

Chapter 13 is a “grand summary” of the results reported in the book, in which Ellis et al. analyze tables with more than 10 human studies. Each such table is used to calculate a consistency index (CI) and a diversity index (DI). The CI is the proportion of studies indicating a sex difference in favor of one of the sexes, and DI indicates the number of world regions in which sex differences were reported. These scores do not reveal the magnitude of sex differences, but instead estimate whether a sex difference is culturally universal or invariant across time and age groups. In the book’s conclusion, Ellis et al. list the “most certain universal sex differences,” those occurring in more than 10 human studies, and in which all results indicate a sex bias.

This volume is a meta-analysis in that it is a study of studies, but it is not a traditional meta-analysis; findings from different studies are not converted to a common statistic and weighted by sample size. Ellis et al. instead chose to perform a vote-counting meta-analysis (a tally of studies by the direction of the sex difference) for three reasons. First, vote-counting is easier, requiring no conversion to a common statistic. Indeed, an analysis of effect sizes could hardly be carried out properly, except by experts in each sex difference who could evaluate methodological and sampling differences between studies, and decide which effect sizes to include and which differences to statistically control. Second, Ellis et al. suggest that a conventional meta-analysis would obscure cross-cultural and temporal patterns by collapsing studies into a single effect size estimate. However, such variables could be entered into analyses as moderators. Finally, Ellis et al. suggest that vote-counting meta-analyses are more easily updated.

For researchers interested in locating specific references or reviewing sex differences in particular areas, the usefulness of this book will depend on its completeness. Ellis et al. chose to include only English studies or studies with English translations that were published as journal articles or books. Dissertations were included, but master’s theses and conference papers were not, unless they appeared in a formal bound proceedings book. Given these restrictions, how completely does this volume cover the literature?

To test this, we investigated three diverse traits: spatial cognition, orgasm frequency, and voice. In general, the coverage of these topics was good, but some studies were missing in each of these areas. For example, Putz, Gaulin, Sporter, and McBurney (2004) reported a sex difference in mental rotation ability but were not cited. Regarding sex differences in orgasm

frequency, Kinsey, Pomeroy, Martin, and Gebhard (1953) were cited, but Masters and Johnson (1966) and Vance (1976) were not. The section on voice was sparsest, which is surprising, given the large and obvious sex differences in vocal traits. The table on fundamental frequency (F_0 , the acoustic parameter closest to pitch) included only studies on vowel pronunciation, not continuous speech, and did not include any studies showing adult sex differences. Baken (1987) cites more than a dozen studies of sex differences in F_0 that are missing from this volume. Likewise, adult sex differences in formant frequencies are not covered. Formants are frequencies of high energy that affect vocal timbre. Men’s formants are lower and more closely-spaced than women’s (see, e.g., Huber, Stathopoulos, Curione, Ash, & Johnson [1999] and Whiteside [2001], neither of which is cited).

The usefulness of this volume will also depend on the ease of locating references in each area of interest. The book is well organized, but some categorization appears a bit arbitrary. For example, Astur, Ortiz, and Sutherland’s (1998) finding of a sex difference in virtual Morris water maze performance was included in the “Morris water maze” table, whereas Driscoll, Hamilton, Yeo, Brooks, and Sutherland’s (2005) finding of a sex difference on the same task was included in the “Maze traversing ability” table.

Overall, the book will be a valuable reference resource for researchers in a variety of disciplines. Ellis et al. hope that their book will help eliminate intentional or inadvertent research biases and highlight areas in which little work has been done, and where future research should fill in the blanks. It will likely contribute to these goals. Missing citations and imperfect organization are to be expected in such an ambitious undertaking, and as this volume is updated, it will only get better.

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