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Understanding the Influence of Interdisciplinary Research: An Examination of Carol Hirschon Weiss's Scholarship

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UNDERSTANDING THE INFLUENCE OF INTERDISCIPLINARY RESEARCH: AN
EXAMINATION OF CAROL HIRSCHON WEISS'S SCHOLARSHIP

by

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Research evaluation is the subfield of evaluation that examines the processes and

products of scientific and technological research. This dissertation explores the case of

interdisciplinary research evaluation by reviewing the publications of one of the most influential

and highly cited scholars in evaluation, public administration, and knowledge utilization: Carol

Hirschon Weiss. As one of the foundational theorists of evaluation, the evaluation perspective of

Weiss's work typically pervades discussions. That approach ignores her influence in other fields,

particularly her centrality to the knowledge utilization field. Prior research indicates that the

influence of interdisciplinary research is challenging to ascertain because research evaluation

tends to rely heavily on quantitative measures, which limit useful comparison among disciplines.

The present study examines the influence of Carol Hirschon Weiss's writings by creating a

systematic map of Weiss's work and identifying disciplines in which citations to her scholarship

appear. Rather than merely identifying which works are cited by which disciplines, the present

study examines qualities presumed related to citation behavior, specifically the type of

publication, the domain addressed, and whether the publication primarily focuses on

methodologies, theories, research results, or reflecting on practice. These qualities are outside the

purview of traditional bibliometrics.

A comprehensive catalog of Weiss's scholarship was necessary before attempting to

determine the existence of relationships between these qualities and citations. Two catalogs (one

each of published and unpublished work) identify Weiss's scholarly output. Categorizations of Weiss's work show most publications were either journal articles or book chapters, most of which espoused theory about knowledge utilization and, to a lesser degree, evaluation broadly and theory-based evaluation specifically. Through the development of a grounded typology of her publications, this study confirmed the earlier work of Mathison (2005) and Newcomer (2015), who independently determined Weiss's notable contributions were:

1. The political nature of knowledge generation;

2. The ways knowledge is used in decision-making; and

3. The nature and method of theory-driven evaluation.

Over 10,000 citations of Weiss's scholarship appear in Scopus as of July 19, 2020. These citations identify the influence of Weiss's scholarship in all twenty-eight subject categories. Somewhat expectedly, citations appear most frequently in the broad subject category of "Social Sciences," which includes education, criminology, sociology, political science, and the social aspects of health and medicine. Weiss's most extensive influence comes from her work identifying the varied uses of knowledge and the roles information plays in decision-making. Taken together, citations to her popular textbook on evaluation (1972, 1998) appear in all Scopus subject categories. Citations to her 1979 article, "The Many Meanings of Research Utilization," appear in every Scopus subject category except "Energy."

The breadth and persistence of Weiss's scholarly influence over the past fifty years distinguish Carol Hirschon Weiss as a notable scholar. Her centrality to the fields of evaluation, knowledge utilization, and policy studies point to her multi- and interdisciplinary relevance. These observations combine to form an overwhelming conclusion that recognizes Weiss as a foundational theorist to understanding the role information plays in society.

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First, I wish to acknowledge and pay respects to the Elders past and present of the Match-E-Be-Nash-E-Wish Band of Pottawatomi, the Traditional Owners of the lands upon which the campuses of Western Michigan University and my home are situated.

Unlike Aphrodite emerging from the sea foam, a dissertation does not merely appear ready for admiration. The process of writing a dissertation is more like Orpheus descending into the depths of the underworld to retrieve Eurydice. The goal is noble, but seemingly innumerable challenges present themselves along the path, and a researcher must overcome each challenge. Of all the challenges, perhaps the most difficult is Doubt, be it in oneself, the topic, the method, the results, or any other aspect of the research process. Being able to overcome my doubts and present a useful contribution to research evaluation was a communal effort.

My doctoral education on the whole, and particularly completing my dissertation, would have been impossible without funding from Western Michigan University's Graduate College and the Interdisciplinary Ph.D. in Evaluation, as well as the State of Michigan through the Martin Luther King/César Chavez/Rosa Park Future Faculty Fellowship program. I am ever grateful for the opportunity to pursue and complete my doctorate with these funds.

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CHAPTER I

INTRODUCTION

"A teacher affects eternity, [s]he can never tell where [her] influence stops."

-Henry Brooks Adams

Evaluating research occupies the minds and time of academics, politicians, and university administrators alike. Efforts to evaluate universities, departments, and individual scholars based on the quality and quantity of their research are commonplace in early twenty-first-century academia (Penfield et al., 2014; Toom, 2018). Tenure, promotion, and outside funding decisions increasingly rely on citation performance and journal impact factor heedless of scientometricians' warnings of bibliometric analyses' limited applicability to these contexts (Gasparyan et al., 2018; Gingas, 2016; McKiernan et al., 2019).

One of the most pervasive issues with citation data is the inability to make accurate comparisons across disciplines (Bornmann & Leydesdorff, 2018; Huutoniemi & Rafols, 2017; Teixeira da Silva & Dobránszki, 2018). This dissertation examines the particular issues of evaluating interdisciplinary research using the work of Carol Hirschon Weiss as an example of highly influential interdisciplinary work.

Research evaluation is the subfield of evaluation concerned with evaluating the quality or quantity of the process, output, or impact of research. The subfield is increasingly prevalent as a practice (Reale et al., 2018) but seldom discussed in the usual disciplinary journals of evaluation.

A notable exception is the journal *research evaluation*[1], which is devoted exclusively to the topic and included in the fourteen "evaluation specific journals" (Coryn et al., 2016, 2017).

Before continuing, four similar terms require clarification. First, the term "evaluation" follows the broad definition provided by Michael Scriven (1991) and adopted by the American Evaluation Association (2014), which identifies "evaluation" as the systematic determination of merit, worth, or significance of an evaluand, or the product of such a process. Second, the term "evaluation research" follows Carol Hirschon Weiss's (1972) definition as the application of social science research methods to "social programs designed to improve the lot of people" (p. 1) and focuses primarily on program evaluation. These definitions identify evaluation research as a particular type of evaluation. Third, the term "research on evaluation" refers to any systematic, empirical inquiry into the theories, methods, practices, or products of evaluation (Brandon, 2015; Coryn et al., 2017). Lastly, the term "research evaluation" refers, rather simply, to the evaluation of research (Coryn et al., 2007; Hicks et al., 2015; Mårtensson et al., 2016; Milzow et al., 2019).

The notion of "research evaluation" requires a bit more refinement. Using Scriven's definition of evaluation, logically, there can be three primary types of a subfield of evaluation. First, a merit-focused research evaluation focuses on the intrinsic value of the research, or the qualities of the research that make it "good" research. In merit-focused research evaluation, the research itself is evaluated against standards related to quality research. Studies assessing the academic quality of research performed or the productivity of a particular researcher, research unit, or university are merit-focused research evaluations. Second, a worth-focused research evaluation concentrates on the extrinsic value the research provides. Presumably, the most common type of worth-focused evaluation looks at the economic impacts of research. Studies

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[1] The journal stylizes its name with no capital letters.

determining the "value for money" of governmental or business research investment fall into the worth-focused research evaluation category. Third, a significance-focused research evaluation addresses the importance of research to society beyond its intrinsic or extrinsic value. The effect research has on societal views, political decisions, and further scientific inquiry fall into the significance-focused research evaluation category.

Significance-focused research evaluation has multiple dimensions. The study presented in this dissertation focuses on how academic work influences further academic work. In literature originating in the United States, the preferred term for how academic work influences future work is "scholarly influence" (Gerow et al., 2018; Haley et al., 2017; Ravallion & Wagstaff, 2011; Takeda, 2011; Truex et al., 2009). The term "academic impact" dominates the literature in the United Kingdom (LSE Public Policy Group, 2011; Morton, 2015; Penfield et al., 2014). Lutz Bornmann (2011) labels this construct "scholarly communication," while Henk Moed (2017) uses "scientific-scholarly impact." Christine Borgman (1990, pp. 13–14) defined "scholarly communication" as "how scholars in any field… use and disseminate information through formal and informal channels." For the sake of clarity and consistency throughout this dissertation, "academic influence" refers to the influence that an idea has on academic discourse. The terms "academic influence" and "scholarly influence" appear interchangeably to add variety to the prose and relieve the reader from relentless repetition.

When considering academic influence, one needs first to identify what constitutes academic work. In the modern university, academic work generally consists of teaching, research, and service. Although teaching and mentoring are vital aspects of academic work, determining the influence of these activities is beyond the scope of both the current practice of measuring academic influence and this study. Academic work's most easily auditable product is

published literature, such as books, journal articles, blog posts, conference posters, and working papers, among others (LSE Public Policy Group, 2011). Citation data derived from published literature is a consistently applied, though a considerably limited measure of academic influence (MacRoberts & MacRoberts, 2010). Over the past fifteen years, scholars created a myriad of metrics to assess the influence and impact of academic work. Most of these metrics focus on different methods of combining and analyzing citation data. The advent of digital publishing and indexing increased the availability of, and access to, the citation data necessary for bibliometric analyses. Accordingly, researchers developed new ways of analyzing this treasure trove of data. Table 1 provides a summary of the more commonly used metrics. Despite the proliferation of new indices and methods, a significant challenge remains, measuring the influence of the steadily increasing volume of interdisciplinary scholarship.

Table 1

Commonly Used Quantitative Metrics in Research Evaluation

Computational metrics	Counting metrics	Composite metrics
impact factor (Garfield, 2019)	followers	altmetrics
Eigenfactor (Bergstrom et al., 2008)	number of downloads	scholarly capital model (Cuellar, Takeda, & Truex, 2018)
h-index (Hirsch, 2005)	retweets	
g-index (Eggue, 2006)	shares	

Researchers interested in measuring academic influence rely on a set of proxy indicators. These include qualitative indicators (generally peer judgments in the form of awards, honors, elected positions, and grant funding) and quantitative indicators, which almost exclusively refer to bibliometric analyses of citation data (Coryn et al., 2007). Most often, measuring academic influence relies on quantitative indicators in some way (Takeda, 2011). Often viewed as an objective measure of a scholar's influence, these indicators are subject to shameful manipulation.

Excessive self-citation to increase quantitative metric scores is one such manipulative practice (Szomszor et al., 2020). Peer judgments run the risk of cronyism within disciplines and the underrepresentation of interdisciplinary scholarship (Bornmann, 2011, 2013; Emmeche, 2019; Holbrook, 2017; Osterloh & Kieser, 2015), despite earlier claims that peer judgment is a reliable system (Cole et al., 1977). The value of citation analysis is limited mostly to a single discipline (Bornmann & Leydesdorff, 2018; Cohn & Farrington, 2012; Gerow et al., 2018; Gingas, 2016; Jones, 1980). The inherent bias toward traditional disciplines within these indicators renders them ill-suited to determining the influence of a scholar who does "boundary work" (Gieryn, 1983) or one whose research involves a high degree of interdisciplinarity (Gerow et al., 2018; Klein, 2017; Lattuca, 2001). Veronica Boix-Mansilla (2017) notes the need for appropriate methods of measuring the influence of interdisciplinary academic work; however, few solutions have been presented. Consequently, researchers evaluating the academic influence of interdisciplinary scholarship tend to rely on woefully inadequate methods (Budd, 2018).

The assumed difference(s) between influence within disciplines and influence between disciplines (Frodeman, 2017b; Lattuca, 2001; Mansilla et al., 2006) forms the basis for this study. Lattuca (2001) recommends studying the entirety of an interdisciplinary scholar's work retrospectively to furthering researchers' understanding of interdisciplinarity and improve interdisciplinarity scholarship. Following this recommendation, this dissertation describes and analyzes Carol Hirschon Weiss's scholarly work. Chapter two examines the nature of influence in academia, the nature of interdisciplinarity, and empirically identifies Weiss as an interdisciplinary scholar.

The Oxford English Dictionary identifies Carol Hirschon Weiss's 1972 text *Evaluation Research: Methods for Assessing Program Effectiveness* as one of the first uses of the term

"evaluation research" ("Evaluation," 2019). In addition to helping define the practice of program evaluation, Weiss published extensively in knowledge utilization and public administration. Her groundbreaking work in knowledge utilization changed the understanding of the relationship between program evaluation and public policy (Newcomer, 2015). During her career, Weiss published more than a dozen books, over 100 articles, and served on multiple national and international research boards (Mathison, 2005). She remains one of the most highly cited evaluation theorists (Heberger et al., 2010). Despite her centrality to the fields of evaluation, knowledge utilization, and public administration, there are no studies devoted to studying the impact of her entire body of work. Through increasing our understanding of Weiss's academic influence in various disciplines, researchers can develop more robust and accurate ways to evaluate interdisciplinary research and scholarship.

The present study applies the qualitative method of systematic mapping to further research evaluation and the study of interdisciplinarity. Systematic mapping is closely related to systematic review and meta-analysis in approach. However, rather than combining findings from various studies, systematic mapping aims to identify linkages (Cooper, 2016). The research questions guiding this dissertation are:

1) What is the size and scope of Carol Hirschon Weiss's scholarship?

   a. What are the published and unpublished works?

   b. What empirically grounded categories or types appropriately describe domains/themes in Weiss's scholarship?

   c. How do these categories interact (e.g., align, intersect) with one another?

2) Which disciplines cite which individual works?

   a. To what extent is Weiss's work cited in various disciplines?

b. To what extent are Weiss's publications that focus on methodology, theory, and research results dissemination cited in various disciplines?

c. What other patterns or trends are observable in the citations?

The remainder of this dissertation follows the traditional five-chapter format. Chapter 2 presents a review of the literature on influence, academic influence, interdisciplinarity, interdisciplinary research evaluation, and a discussion of Carol Hirschon Weiss's academic and professional background, existing categorizations of her work, and the fields she influenced through her work. Chapter 3 describes the study's methods and methodology, including a discussion of systematic mapping and empirical typology creation. Chapter 4 presents the findings from the systematic mapping. Finally, Chapter 5 provides a discussion of the findings in the context of research evaluation and the limitations of the current study. Suggestions for future research appear in Chapter 5.

CHAPTER II

LITERATURE REVIEW

This dissertation examines Carol Hirschon Weiss's publications as an exemplar of influential interdisciplinary scholarship. To appropriately understand this topic, the extant literature of four fields was reviewed. The chapter begins with explaining this study's theoretical orientation, specifically looking at how citation behavior is viewed and understood and what citations mean or represent. Next is a discussion of Weiss's scholarship, including her academic and professional background. The fields of study in which she is widely accepted to have been influential follow, and the four prior studies analyzing her work are compared and contrasted within the discussion. Next comes a historical perspective of interdisciplinarity, which brings to light the issues of identifying and defining interdisciplinarity. Understanding influence, both generically and within academia, is the focus of the following section, with particular attention paid to how researchers propose to measure academic influence. An examination of the nascent area of interdisciplinary research evaluation comes next. Finally, the chapter ends with a summary and synthesis of the existing literature on the topics mentioned above.

Theories of Citation

The present study uses citations of Weiss's work as instances of recognition in disciplinary conversations. Underlying this application of citation data is the belief that citations and influence are related. Most uses of citation data rely on statistical manipulation to approximate influence. Bibliometric indicators of this variety account for much of the discussion of measuring academic influence in contemporary practice and are discussed later in this chapter. This section discusses the five dominant theories of citation found in the literature.

A theory of citation identifies the underlying beliefs about why citations occur and what the act of citing an author's work means. Put another way, a theory of citation examines what is trying to be conveyed by a citation, or the act of citing. Henk Moed (2005, pp. 193–208) provides an overview of five theories of citation behavior: physical, sociological, psychological, historical, and information- or communication-scientific. The existence of multiple, conflicting theories of a citation could suggest the field is not mature enough to present a single coherent understanding. Such an assumption would be misguided. Theories of citation are not mutually exclusive, and a single study can follow more than one theory of citation (Moed, 2005, p. 221). Theories of citation simply emphasize various aspects of the citation process. For example, the psychological theory of citation focuses on the citer's motivation for referencing a work. Alternatively, the sociological theory of citation examines how research communities determine the significance of a piece of research. A study examining why a scholar chooses to cite a particular document can employ both the psychological theory of citation and the sociological theory of citation.

This dissertation examines academic influence in and among various academic communities or disciplines. Understanding science as a social phenomenon suggests the sociological theory of citation is the most appropriate to this context. According to the sociological theory of citation, citing a work serves as recognition of an author's intellectual property rights, and therefore citations are useful indicators of academic influence (Aksnes, 2005). As such, citations are a proxy measure of scholarly influence and academic quality as self-defined by a community of academics. Robert K. Merton (1968) first put forth the sociological theory of citation. Later, he observed that if intellectual property is not "used by others in the system of science, doubts of its value are apt to rise" (Merton, 1977). Stephen and

Jonathan Cole (1971) expanded Merton's work and ultimately tied the act of citing a publication to a perception of high academic quality. One of the Coles' findings is that citations are a more accurate and efficient way to identify influential pieces of research (S. Cole et al., 1977). Research by Giovanni Abramo and Ciriaco Andrea D'Angelo (2011) led the authors to assert "for the natural and formal sciences, the bibliometric methodology is far preferable to peer-review" (p. 501). Critically, the findings from these and similar studies are found in the natural sciences and not in the social and behavioral sciences (Aksnes et al., 2019). Harriett Zuckerman defended the link between citation and influence against Henry Small's (1978) suggestion that citations are merely persuasive symbols of information. She observed, "it is peer recognition of the cognitive worth of the sources grown influential, initially reflected in high rates of citation, that makes [the cited research] authoritative" (Zuckerman, 1987). Pentti Nieminen and colleagues (2006) found no (statistically significant) relationship between citation count and the appropriateness of the statistical analysis employed to the publication's research question(s), laying further doubts about the relationship between research quality and citation count.

The sociological theory of citation is closely related to both the historical theory of citation and the information- or communication-scientific theory of citation. Eugene Garfield, a pioneer of citation indexing and proponent of historical citation analysis approaches, holds that citations hold a symbolic value in the current work for the cited work (1964). For Garfield (1985), the intrinsic value of a particular scientific publication is potentially independent of its academic influence. Small (1978) builds on this understanding of citation and referencing behavior. Garfield partly views citations as a means of persuading the reader that one's research fits into disciplinary norms. In this view, a citation is almost a plea of legitimacy to a scholarly community, be that an entire discipline, subfield, or niche within a discipline.

Paul Wouters brought a new understanding of the concept to the communication of information by distinguishing between two theoretical concepts of information: a paradigmatic concept whereby information is "anything that makes a difference different" and a formal concept of information in which all meaning is purged. The paradigmatic concept addresses within-discipline concepts of importance and novelty (Wouters, 1999). The formal concept implies that a citation has a meaning of its own that is unrelated to the information "at the other end" of the citation (Wouters, 1998), which aligns with Garfield's and Small's symbolic understanding of citations. For example, by citing Wouters's work in the previous sentence, I am citing my interpretation and understanding of Wouters's nineteen-page article. My interpretation might align with Wouters's content or intent but cannot capture every aspect of the article. My interpretation might be at odds with Wouters's own words. Regardless, by citing the work, I am engaging with and acknowledging the material it presents. Wouters's theory of citation relies heavily on both sociological and physical theories of citation.

Loet Leydesdorff tends more toward the sociological side of the information- and communication-scientific theory of citation. More than two decades ago, Leydesdorff and Wouters argued that the meaning of a citation changes over time (1999). In more recent work, Leydesdorff and colleagues found empirical evidence of this shift in meaning over time, with citations of recent work indicating engagement with current trends in a research domain and citations of older work recognizing the incorporation and codification of knowledge within a domain (Leydesdorff et al., 2016). This change in meaning aligns with Wouters's formal concept of citations within the information- and communication-scientific theory of citation. Ultimately, even the most valuable and groundbreaking works become part of general human knowledge and, therefore, rarely cited.

Generally, there is a positive correlation between citation counts and perceptions of academic influence, but the link is weak and even negative in some fields (Aksnes et al., 2019). In truth, the connection between citation counts and academic influence is unknown and statistical measures implying a linkage without noting this should be held suspect (Thelwall, 2016). Regarding altmetrics and other proposed metrics such as Mendeley readership and tweets, investigations suggest the magnitude of the correlation is related to not only the quality of the research but also average citation counts, the variability of data, the underlying quality of the data, and the discipline (Bornmann & Haunschild, 2018; Mohammadi & Thelwall, 2014).

The discussion of theories of citation presented above conflates the notions of influence and quality while steering clear of the term "impact." The conflation mirrors the generic use of quantitative citation analysis for research evaluation and the historical development of theories of citation. Discussion of research quality is mainly absent from the foundational work following the historical theory of citation (Garfield, 1964, 1985). Early works following the sociological theory of citation contend citations are a proxy indicator for quality (Cole et al., 1977; Merton, 1968; Zuckerman, 1987). Moed's work frames the concepts of quality and impact in terms of science-policy decisions and holds that impact is actual influence and unavoidably related to quality (Moed et al., 1985). However, quality and impact need not be related concepts. One extreme example of influential research that was of low quality is the work of Dr. Andrew Wakefield that tied vaccinations to autism (Eggertson, 2010). Research employing information- and communication-scientific theory of citation suggests "impact" is a sort of fallacy because citation count depends on quantity, though the quality of research is independent of influence (Leydesdorff et al., 2016). Ultimately, citation theories are independent of whether a quantitative, qualitative, or mixed-method approach are employed in citation research.

Carol Hirschon Weiss's Scholarship

Carol H. Weiss is a central figure in the establishment and maturation of program evaluation. In their seminal text on evaluation theory, *Foundations of Program Evaluation: Theories of Practice*, William Shadish, Thomas Cook, and Laura Leviton (1991b) identify and interpret seven foundational theorists' approaches to evaluation based on these theorists' views of knowledge, valuing, use, social programming, and practice. This group of leading scholars is held as the "big seven" evaluation theorists (Astbury & Hawkins, 2019) and includes Donald Campbell, Lee Cronbach, Peter Rossi, Michael Scriven, Robert Stake, Carol Weiss, and Joseph Wholey. While Weiss's inclusion in this group illustrates her significant contributions to evaluation, it belies her influence in other fields, including criminology, education, knowledge utilization, public policy, and sociology. The following sections provide an overview of Weiss's career and a discussion of the existing categorizations of her work. Along the way, the discussion identifies shortcomings present in the current literature on Weiss's influence.

Academic Background

In 2013, Carol Hirschon Weiss's death at the age of 86 was announced in the *New York Times*, the *Boston Globe*, the official journals of the American Evaluation Association, American Sociological Association, American Society for Criminology, American Association for Public Opinion Research, The Tavistock Institute (UK), Cornell University Alumni Association, and by the Dean of The Harvard Graduate School of Education. A careful review of these sources, along with biographies, interviews, and oral histories published throughout Weiss's career, shows disagreement between official records and friends and colleagues' recollections concerning Weiss's dissertation. Therefore, the following section is intentionally repetitiously cited to provide the reader with the most accurate picture of Weiss's academic achievements.

Carol Hirschon (Weiss) received her undergraduate degree in government from Cornell University in 1946 and her master of arts in government from Cornell University in 1947 ("Alumni Deaths," 2013; A. Barton, 2013; Mathison, 2005). Weiss completed her doctoral degree at Columbia University in 1977 (Alkin, 2013a; A. Barton, 2013; J. S. Barton, 1984; Weiss, 1977e). Her doctoral degree is said to be in sociology (A. Barton, 2013; Mathison, 2005; McCartney, 2013) with the eminent interdisciplinary scholar Amitai Etzioni as her dissertation advisor (Janet Weiss, her daughter, and coauthor, personal communication, February 27, 2017), though it appears her dissertation was submitted to the political science faculty (C. H. Weiss, 1977e). Precisely which document Weiss submitted as her thesis is also unclear. Allen Barton (2013), director of the Bureau of Applied Social Research at Columbia University for most of Weiss's tenure, recalls that Weiss submitted her text, *Evaluation Research: Methods for Assessing Program Effectiveness* (1972), in lieu of a dissertation. Barton's recollection contradicts records at Columbia University listing Weiss dissertation as the unpublished *The Usefulness of Social Research for Decision-Making in Mental Health* (1977a), including an accounting of the Bureau of Applied Social Research's archives (J. S. Barton, 1984). These discrepancies do more than frustrate and confuse researchers and allow for questioning the accuracy of official records and recollections - they underscore the two areas Carol Weiss identified as her scholarly interest: evaluation and knowledge utilization (Janet A. Weiss, personal communication, December 15, 2016). These discrepancies suggest that from early in her career, Weiss's scholarly efforts struggled against disciplinary silos.

Professional Background

Weiss began her career in evaluation in the early 1960s as an evaluation consultant for a juvenile delinquency program operated through the newly formed Associated Community Teams

in Harlem (A. Barton, 2013; The Oral History Project Team & Weiss, 2006). Weiss became the research director at Associated Community Teams in 1963, a position she held for two years ("Biographical Sketches," 1977). Her evaluation work in juvenile delinquency put her in close contact with the small community of evaluation researchers across the country, as well as with poverty researchers at the Bureau of Applied Social Research (the Bureau) at Columbia University (A. Barton, 2013; The Oral History Project Team & Weiss, 2006). She joined the Bureau in 1965 and promptly began working on a new report addressing validity issues when interviewing low-income populations (Weiss, 1966c) and continuing her work on juvenile delinquency (Weiss, 1966b), both projects funded by the US Department of Health, Education, and Welfare. The Bureau was an explicitly cross-disciplinarily organization, allowing Weiss and colleagues to tackle topics in communications, urban and poverty studies, education, manpower, and population studies (J. S. Barton, 1984, p. 3). As the Bureau's work expanded and diversified in the late 1960s and 1970s, Weiss became the head of a unit dedicated to evaluation and research utilization (J. S. Barton, 1984). She remained a senior research associate with the Bureau until its closure in 1977 (J. S. Barton, 1984) and briefly stayed on with its successor organization, The Center for the Social Sciences at Columbia University.

With her recently-awarded doctoral degree in hand (regardless of the discipline), Weiss secured a position as a senior research associate at The Harvard University Graduate School of Education (HSGE) in 1978 ("Back Matter," 1980). By 1980, Weiss added "lecturer" to her duties at HSGE (Weiss, 2008) and senior lecturer by 1985 (Weiss, 1985). She became a professor at HSGE in 1986 (Weiss, 1987, 2007) and continued this role until her retirement in 2006 (Alkin, 2013b; McCartney, 2013; The Oral History Project Team & Weiss, 2006). Over the next decade, Weiss remained active academically, publishing an additional five articles and attending

academic conferences. The notion of a sociologist trained predominantly in political science who is a professor of education reinforces the understanding that academia's traditional disciplinary divisions did not bind Weiss's research.

Existing Categorizations of Weiss's Work

To deepen our understanding of Weiss's scholarly influence, several scholars offer categorizations of her contributions. The purposes of these categorizations differ substantially. Shadish, Cook, & Leviton (1991), by focusing on the ways Weiss discusses evaluation, identify a "turning point" in Weiss's scholarship. Weiss (2004, 2012) reflects on her career more holistically and discusses her contributions to evaluation theory and evaluation practice. Mathison (2005) focuses on Weiss's unique contributions to evaluation, and Newcomer (2015) concentrates on identifying the recurrent themes in Weiss's scholarship. All four categorizations discuss Weiss's influence in evaluation, but only Newcomer (2015) explicitly examines how Weiss's scholarship influences evaluation practice in various disciplines.

Shadish, Cook, & Leviton (1991) simply divide Weiss's scholarship into the early stages and later stages of her career, with the publication of "The Many Meanings of Research Utilization" (1979) marking the divide. In their view, this publication marked the end of Weiss distinguishing between program evaluation, policy analysis, and applied social research in her writings (p. 190). From this point on, they contend, Weiss treats these activities nearly synonymously. Shadish and colleagues (1991) caution against seeing this shift (fusing of terminology) as Weiss abandoning the field of evaluation, however, suggesting it is a refinement in her thinking (p. 190). Absent from this analysis is the understanding that in 1977, Weiss received her doctorate. Presumably, since this article still lists the Weiss's institutional affiliation as Columbia University, the paper was submitted for publication in 1977. The perceived shift in

Weiss's thinking might result from having attained a terminal degree, and signal a change not in Weiss's thinking, but rather in how she was "allowed" to express her opinions in the academic world.

Unlike Shadish, Cook, & Leviton's (1991) goal of uncovering Weiss's theory of evaluation, Weiss explicitly describes her approach to evaluation by addressing both the practical (a, b, c, and f) and theoretical (d, e, and g) dimensions. In a reflection near the end of her career, Weiss (2004, 2012) identifies seven aspects of her work in evaluation:

(a) evaluation as seeking objectivity

(b) evaluation as professional practice

(c) acknowledging the limits of evaluation

(d) evaluation as enmeshed in politics

(e) evaluation and program theory

(f) the culmination of evaluation evidence

(g) evaluation use

The theoretical aspects emerge in both Mathison's (2005) and Newcomer's (2015) analyses (see Table 2). Mathison (2005) identifies three areas that Weiss pioneered in evaluation: (a) recognizing the political dimensions of evaluation, (b) broadening the meaning of "use" in evaluation, and (c) developing the theory-based approach to evaluation (p. 449). In her analysis, Newcomer (2015) points to four threads present throughout Weiss's work: (a) the role of evaluation in improving policy, (b) the various ways evaluation is utilized, (c) the method and importance of theory-based evaluation, and (d) the implications of the political nature of programs (p. 327).

Table 2

Comparison of Existing Categorizations of Weiss's Work

Shadish, Cook, & Leviton (1991)	Weiss (2004, 2012)	(Mathison, 2005)	Newcomer (2015)
Early career (Pre-1979 article)	(a) evaluation as seeking objectivity (b) evaluation as professional practice (c) acknowledging the limits of evaluation		
	(d) evaluation as enmeshed in politics	(a) recognizing the political dimensions of evaluation	(a) the role of evaluation in improving policy
Late career (Post-1979 article)			(d) the implications of the political nature of programs
	(e) evaluation and program theory	(c) developing the theory-based approach to evaluation	(c) the method and importance of theory-based evaluation
	(f) culmination of evaluation evidence		
	(g) evaluation use	(b) broadening the meaning of "use" in evaluation	(b) the various ways evaluation is utilized

All four categorizations have the common goal of identifying which aspects of Weiss's scholarship set her apart as an evaluation theorist, scholar, and practitioner par excellence and provide a solid launchpad for future studies, such as the present study. However, these categorizations neglect an essential aspect of Weiss's scholarship – its inherently interdisciplinary nature. Newcomer (2015) identifies the breadth of fields Weiss's scholarship influences. In this sense, Newcomer comes the closest to identifying Weiss as an interdisciplinary scholar. By neglecting Weiss's interdisciplinarity, we ignore the breadth of her influence.

Fields of Influence

This section focuses on four principal areas Weiss influenced: providing a voice for the marginalized, and the scholarly fields of program evaluation, public administration and public policy, and knowledge utilization. The awards and honors Weiss received from scholarly associations and studies of Weiss's scholarship form the basis for selecting these three scholarly fields. However, Weiss's work is also prevalent in education, criminology, business, and social work, among others (Newcomer, 2015). The inclusion of "providing a voice for the marginalized" illuminates a persistent theme in Weiss's scholarship that makes her unique among the early luminaries of evaluation theory.

Voice for the Marginalized

Weiss was intimately familiar with the adverse societal effects of discrimination. Among the seven foundational evaluation theorists, Weiss is the earliest to explicitly focus on promoting the voice of disadvantaged groups and advancing social justice through evaluation (Shadish et al., 1991b). Her earliest publications mostly address methods for sensitively and appropriately gathering valid data from marginalized groups, including women, the poor, and incarcerated and formerly incarcerated individuals (Weiss, 1966, 1967b, 1968). Regarding the practice of evaluation, Weiss stated, "[w]e should try to ensure that the most deprived groups, usually the program recipients, have a strong chance to be heard" (Weiss, 2012, p. 132).

Her attention to the plight of groups experiencing discrimination includes her own experience as a female academic. She came to prominence in fields dominated by men, during a time when academia was very biased toward male scholars. Despite the mostly chauvinist climate, Weiss was the first scholar to publish a "general" evaluation textbook in 1972 (Patton, 2013). She also is the only woman to publish an evaluation textbook without a male coauthor for

more than three decades, which she did twice (Davidson, 2005; Weiss, 1972, 1998). The inscription to the 1972 text fittingly reads, "TO MY HUSBAND who doesn't talk much about women's liberation but has always practiced it." Additionally, she is the only woman among the seven foundational evaluation theorists presented in Shadish, Cook, & Leviton's (1991) book on evaluation theory. Weiss reflected on some of the triumphs and trials that female academics face in a speech originally given to the Faculty Women's Association at Arizona State University and later published in the national newsletter for the Women's Caucus for Political Science (1988).

Evaluation Theory

In addition to being a champion for those with a stifled voice, Weiss was a "widely influential" evaluation theorist and practitioner (Shadish et al., 1991a, p. 180). The most recent published bibliometric analysis of evaluation theorists' publications identifies Weiss as one of the most-cited authors in evaluation (Heberger et al., 2010). According to Anne Heberger and colleague's analysis of Web of Science data, Weiss is tied with Michael Quinn Patton for the second-highest number of citations at 938, less than 40 citations behind the most cited theorist Donald T. Campbell, and more than 80 more citations than the next most-cited theorist Michael Scriven (p. 29). The number of citations identified by Heberger and colleagues is much lower than expected. The research was performed over a decade ago when substantially fewer publications from before 1996 were indexed. Their analysis used a random selection of articles for each author rather than all articles. The purpose of sampling in this study appears to be data convenience rather than to draw inferences to the general population. The article mentions neither how well the included articles matched the entire population, nor the list of articles included. These omissions complicate updating these data for comparison.

Using Google Scholar data, Newcomer (2015) noted Weiss's 1972 evaluation text had been cited 1,419 times in fields as diverse as business, criminal justice, health and medicine, international studies, public policy, psychology, and social work (p. 330-1). Citation data from Google Scholar on August 12, 2020, notes the 1998 second English edition of this text has been cited 3,476 times, while the 1972 first English edition of the book has been cited 2,575 times. Additionally, Weiss authored four of the twenty-five most cited articles in the *American Journal of Evaluation* according to Scopus data on August 14, 2020. The Evaluation Research Society, which merged with Evaluation Network to become the American Evaluation Association, presented Weiss with the Alva and Gunnar Myrdal Award for Science in 1980. With such a sizeable influence, it is not surprising that Mathison (2005) dubbed Weiss the "Founding Mother" of evaluation (p. 449).

Public Administration and Policy Analysis

Weiss also has considerable influence in the fields of public administration and policy analysis. Many of her most cited works were published initially in public administration or policy analysis journals. Despite their interconnectedness, no scholars explicitly examined the interplay of evaluation and policy until Weiss's groundbreaking and influential work approximately a half-century ago (Weiss, 1967a, 1973a, 1973b, 1973c). In 2015, Public Administration Review (a top-five journal in public administration) named her 1979 article "The Many Meanings of Research Utilization," one of its seventy-five most influential articles of the past seventy-five years (Public Administration Review, 2016). According to Google Scholar data from August 2020, the article is the fourth most cited article in the journal's entire eighty-year publication history.

Weiss's 1977 article, "Research for Policy's Sake: The Enlightenment Function of Social Research," is the most cited article during the brief publication of *Policy Analysis* (1975-1981), receiving more than four times the citations of the next most cited article. This article remains the fourth most cited article in *Policy Analysis*'s successor journal, *Journal of Policy Analysis and Management* (another top-five journal in public administration). These rankings firmly place Weiss with public administration and policy scholars such as Edward Sayre, Harold Lasswell, Frederick Lindstrom, Theodore Lowi, Aaron Wildavsky, and Elinor Ostrom. Weiss served as the President of the Policy Studies Organization in 1984 and received the Policy Studies Organization Award in 1988.

Knowledge Utilization

Weiss is one of three scholars identified at the conceptual center of knowledge utilization. Nathan Caplan, Robert Rich, and Carol Weiss are the only authors who remained highly cited knowledge utilization scholars between 1975 and 2004 (Estabrooks et al., 2008). Rich and Weiss received funding aimed explicitly at knowledge utilization research from the National Institutes of Mental Health (NIMH) in the mid-1970s (The Oral History Project Team & Weiss, 2006). Two more of Weiss's highly cited works appear in this field: the article, "Knowledge Creep and Decision Accretion" (1980) in *Knowledge: Creation, Diffusion, Utilization* (now called *Science Communication*) and the book Weiss edited with Michael J. Bucuvalas, *Using Social Research in Public Policy Making* (1977b). Weiss moved the field from a simple instrumental view of research use to the nuanced understanding that knowledge is utilized in multiple ways. In "Many Meanings of Research Utilization," she proposed seven models of knowledge utilization: knowledge-driven, problem-solving, interactive, political, tactical, and enlightenment (Weiss, 1979). Most of these models have received little empirical investigation until recent years

(Daviter, 2015), suggesting her observations may have been significantly ahead of their time. She received the Howard Davis Memorial Lecture Award from the Knowledge Utilization Society in 1991. In recognition of Weiss's pioneering work in knowledge utilization in the political context and respect for her work's enduring legacy, *Evidence & Policy* created the Carol Weiss Prize to recognize the most groundbreaking new research in the field by an early career scholar (Boaz & Gough, 2016).

Interdisciplinarity

Primarily, this study addresses the lack of an empirical understanding of interdisciplinary scholarship. Proponents laud interdisciplinarity as the future of academic inquiry and the best way to solve intractable social problems. On the other hand, critics bemoan interdisciplinarity as mere window-dressing or a buzz-word (Graff, 2016). Regardless of its utility, interdisciplinarity is an established, distinct field of inquiry existing alongside the traditional disciplines (Frodeman, 2017b). The ubiquity of interdisciplinarity in contemporary academic and educational discourse does not necessarily translate into a greater value associated with interdisciplinary scholarship (Yegros-Yegros et al., 2015). Despite being an integral part of modern academia, there is disagreement on what constitutes interdisciplinarity (Ledford, 2015). Scholarship around interdisciplinarity is vast. In addition to philosophical questions of epistemology and knowledge formation more generally (Turner, 2017), there are as many types of interdisciplinarity as there are disciplinary intersections. Much current scholarship on interdisciplinarity focuses on how academics navigate interdisciplinary spaces (Frickel et al., 2016). Earlier studies of interdisciplinary scholarship call for studies that trace interdisciplinary scholars' careers, paying particular attention to the types of questions addressed over time (Lattuca, 2001). To this end, the present study analyzes data from Carol Hirschon Weiss's

publications and citations of her work to understand the influence of interdisciplinary scholarship in practice.

Brief History of Interdisciplinarity

The history of interdisciplinarity and related concepts is long and storied (see Al-Suqri & AlKindi [2018] for a history of interdisciplinarity). Academic disciplines came about during the nineteenth century when specialization in differing aspects of human knowledge became de rigueur (Biglan, 1973a, 1973b). Before this time, a more holistic view of academic inquiry was the norm. Presently, researchers view disciplines as an epistemological necessity, entrenched behemoths, or part of an unnecessary, antiquated practice (Jacobs, 2014; Jacobs & Frickel, 2009). Matthew (TwoTrees) Haar Farris (2017) presents a valuable examination of disciplines and interdisciplinarity through the lens of Jacques Derrida's work, concluding that the two concepts are intrinsically related and recursively aligned. Either way, the categorization of knowledge into disciplines is widely accepted and encouraged through academic hiring practices (Byrne, 2014), and therefore the academy more broadly. Felicity Callard and Des Fitzgerald (2015) caution against placing too much emphasis on the perceived overt disciplinarity of academia, noting that "gatekeepers are explicitly looking for people – in the humanities and social sciences as well as the sciences – who have expertise in interdisciplinary, collaborative projects" (p. 12). The inclusion of multiple interdisciplinary funding mechanisms at the National Science Foundation and the European Research Council (König & Gorman, 2017) suggests this is true. Rather than viewing academic disciplines as an intractable monolith into which all knowledge must fit, the more accurate view is that disciplines are a constantly evolving space.

The changes in the meaning of "political economy" from the eighteenth through the twenty-first century illustrate the mutability of academic disciplines. Until the mid-nineteenth

century, the modern discipline of economics was inseparably tied with the study of politics and identified as political economy. The divorcing of political concerns from economic thought around the development of the concept of utility created these two distinct disciplines (political science and economics) with their associated favored methodologies and established bases of literature. Over the next century, the term political economy regained its prior ground but now exists as either an interdisciplinary field or subdiscipline depending on one's view (Drazen, 2018). The study of the interplay between politics and the economy never stopped, but the boundaries of disciplines of political science, economics, and political economy shifted. For some, this suggests that disciplines are an arcane and unnecessary human construct that obscures reality (Cohen & Lloyd, 2014; Lattuca, 2001). Perhaps it only highlights the mutability of all human constructs – and implies no need for further judgment of it.

The expansion of tertiary education and the growth of the modern, corporatist university helped solidify disciplinary divisions of knowledge. During the post-war period, calls for cross-disciplinary work and interdisciplinary work increased as the connection between social research and addressing and ameliorating social ails became more prominent (Klein, 2017; OECD, 1972; Winch, 1947). The focus on solving these intractable or "wicked problems" (Rittel & Webber, 1973) through interdisciplinary efforts created tension between the disciplines and the idea of interdisciplinarity. Alongside the growth of interest in interdisciplinary problem-solving was the increased study of the phenomenon itself. Some scholars view interdisciplinarity as an epistemological imperative, which directly confronts the idea that disciplines themselves are an epistemological necessity (Boon & Van Baalen, 2019; Graff, 2016; Lattuca, 2001). Lisa Lattuca asserts that "interdisciplinary approaches result in less distorted forms of knowledge and thereby redistribute power to individuals who would otherwise be powerless," and as such,

interdisciplinary approaches are the only routes to "genuine understanding and equality" (2001, p. 16). To combat the inertia caused by the sheer number of possible disciplinary combinations encompassed by interdisciplinary research, Veronica Strang and Tom McLeish (2015) focus on the underlying epistemic values of interdisciplinarity: breadth, integration, and transformation. Many other scholars echo the transformative value of interdisciplinary research (Bruun et al., 2005; Callard & Fitzgerald, 2015; Huutoniemi & Rafols, 2017; Pfirman & Martin, 2010). Perhaps ironically, there have even been calls to create a discipline of interdisciplinarity itself (Bammer, 2017).

Defining Interdisciplinarity

Complicating the study of interdisciplinarity is the inherent difficulty of studying something that exists between fuzzy boundaries. The blurred boundaries of disciplines are a significant issue in defining interdisciplinarity (Krishnan, 2009; Lattuca, 2001). Multiple definitions of interdisciplinarity exist, and it seems that none are considered standard or dominant. Frodeman (2017a) broadly identifies interdisciplinarity as "intra-academic integration of different types of disciplinary knowledge" (p. 4). This definition focuses on relationships in the academic world, ignoring the significant issue of how academics interact with the world outside the academy. As society moves away from a model of having the university as the primary place of knowledge creation to a shared, or perhaps supplanted, relationship with business, the millennia-old views of each entity's role and function in knowledge creation will change.

Julie Thompson Klein (2017), one of the leading scholars on interdisciplinarity, offers a full typology of the various kinds of disciplinary interaction. She also examines the use of terms to describe these interactions over the past half-century. Klein distinguishes between the "generic

uses" of terms and the particular uses she sees coalescing in research on interdisciplinarity. Many writers treat multidisciplinarity, interdisciplinarity, and transdisciplinarity as synonyms. Klein (2017) proposes a continuum starting with multidisciplinarity addressing the juxtaposition of disciplines, interdisciplinarity addressing integration, and transdisciplinarity, a recently ascendant term addressing four differing viewpoints. The four trends in understanding and defining transdisciplinarity refer to the prioritization of differing aspects of disciplinary interaction, namely (a) the systematic integration of knowledge, (b) transcendence of disciplinary worldviews, (c) rejection of disciplinary divisions, and (d) heterogeneous, nonlinear knowledge creation. Aspects of these four trends are also present in discussions of interdisciplinarity. The primary concern of this study is the interdisciplinarity of Weiss's influence. Though one might argue Weiss's work is transdisciplinary or that evaluation is inherently transdisciplinary, more consensus around transdisciplinarity is necessary. Dominic Villeneuve and colleagues (2020) found the dominant hierarchy of multidisciplinarity, interdisciplinarity, and transdisciplinarity inadequate to describe interdisciplinary research practice. Their study found that interdisciplinary research requires multiple disciplines, ontologies, and a common "wicked" problem.

Examinations of interdisciplinarity frequently occur along two dimensions. The first dimension contrasts the traditional disciplines with "boundary work," or the spaces at the edge of a discipline or between two or more disciplines (Gieryn, 1983; Klein, 2017). As discussed above, this is murky territory. The second dimension addresses which entity exhibits interdisciplinary aspects: the concepts, the methodology, the project, the research, the scholar, the theory, the team, and so on (Klein, 2017; Lattuca, 2001). Though some aspects of this dimension are apparent (scholar vs. team), others are muddy. For example, particular methodologies are not necessarily the purview of only one discipline, e.g., survey research or mass spectrometry.

Moreover, because disciplinary boundaries necessarily change over time, the concept of interdisciplinarity must also change over time. This constant state of flux in each discipline's definition will continue to complicate demarking the boundaries of interdisciplinarity.

Most definitions identify the integration of disciplines as the hallmark of interdisciplinarity, claiming that merely using another discipline for contextual or illustrative purposes falls short of true interdisciplinarity (Klein, 2017). Sally Aboelela and colleagues (2007) systematically derived the following definition of "interdisciplinary research" from multiple understandings of interdisciplinarity. Their narrow definition is:

> [A]ny study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines through-out multiple phases of the research process.

McLeish and Strang (2016; Strang & McLeish, 2015) contend that this definition is too constrictive as it requires interdisciplinary research to occur as part of a team effort. The acknowledgment that interdisciplinary scholarship may be the work of an individual scholar is long-standing (Land, 2011, pp. 7. citing Giddens 1991). The National Science Foundation and the European Research Council both privilege interdisciplinarity research in funding decisions (König & Gorman, 2017). However, these funders seem to limit the understanding of interdisciplinarity to "emerging areas" (p. 513) in their funding schemes. Some scholars believe that including community input is another hallmark of interdisciplinarity (Barry et al., 2008; Strang & McLeish, 2015).

Combining the above definitions and insights, we can understand "interdisciplinarity" as the area(s) of study that addresses problems that require collaboration, cross-fertilization, and integration between two or more traditional academic disciplines and impacted communities. Some have argued that this understanding intersects with resolving intractable social issues (Head & Alford, 2015; Ledford, 2015; Parkhurst, 2016), but this need not be the case. Robert Crease (2017) points out various forms of interdisciplinarity in the physical sciences date back to the late nineteenth century, including some current disciplines that used to be considered interdisciplinary. Ultimately, it is necessary to remember that interdisciplinary research can occur between any two or more disciplines to solve any issue that requires knowledge from the contributing disciplines, including learning from impacted individuals' lived experiences.

Lattuca (2001) offers four types of interdisciplinarity: informed disciplinary, synthetic interdisciplinarity, transdisciplinarity, and conceptual interdisciplinarity. These types do not form a continuum but are somewhat discrete forms of interdisciplinarity. Informed disciplinarity borrows from other disciplines to illuminate disciplinary questions matching Klein's understanding of multidisciplinarity. Synthetic interdisciplinarity occurs when the problem belongs to all involved disciplines. In synthetic interdisciplinarity, disciplinary roots are still evident, but theories from different disciplines fuse and conflicting aspects are explicitly examined. Transdisciplinarity applies aspects across disciplines aiming to identify an overarching synthesis. Conceptual interdisciplinarity includes inquiry that either lacks a compelling disciplinary basis or inherently requires contributions from various disciplines.

Despite the lack of broad consensus on the meaning or indicators of interdisciplinarity and its types, there is consensus that interdisciplinarity exists. This dissertation accepts the integration of disciplines in research practice and uses the term "interdisciplinary" to refer to this

integration. The importance of conceptual integration to interdisciplinary research evaluation is discussed later in this chapter.

Influence

Influence commonly means the ability to get someone to do something one otherwise would not do. Often, such an action is the result of some explicit persuasion or coercion. Some examples of determining persuasive influence are ascertaining whether an advertisement or sermon motivated a particular action, finding out if calling a love interest the day after a date makes one seem "too eager," researching how new knowledge about a social issue affects public policy and studying how a change in medication alters behavior or disease progression. Policy tools generally are coercive forms of influence. Schneider and Ingram (1990) identify broad categories of policy tools designed to influence public behavior, including authority (regulations and laws), incentives (such as tax breaks), capacity building (informational campaigns), and symbolic or hortatory (appeals to core values like justice).

Another type of influence is automatic influence, or what Robert Cialdini calls "click-whirr" reactions (2006). "Click-whirr" reactions are automatic, stereotyped responses to situations that evolve as mental shortcuts. These mental shortcuts exist because employing one typically leads to the right decision. Cialdini identifies six categories of automatic influence: reciprocity, commitment and consistency, social proof, authority, liking, and scarcity (2006). Examples of "click-whirr" reactions include: taking something handed to you (consistency), the behavior of subjects in the Milgram experiments (authority), purchasing something solely because your friend suggested it (social proof, liking), and assuming that an item is valuable because there are few of it (scarcity). The "weaponization" of automatic influence occurs when

someone exploits "click-whirr" reactions. One example is using a "free gift" to get patrons into a store to buy additional items.

Regardless of whether an instance of influence results from persuasion, coercion, or automatic responses, determining what influenced behavior is a matter of determining causality. Consequently, measuring influence assesses the degree of causality. However, causality appears to play little role in current practices of measuring academic influence.

Measuring Academic Influence

Current measures of academic influence rely on counting how many times something is published or cited, suggesting determining academic influence depends more on popularity than on causality. The underlying assumption is that the more citations or publications, the more important or impactful the research or scholar is. Though there may seem to be fatal flaws in using citation data to determine academic influence, employing a theory of citation helps illuminate citation data's usefulness. As noted earlier, this dissertation follows the sociological theory of citation traditions.

The process by which research, evaluation, or analysis influences decisions is portrayed as a linear, instrumental process consisting of knowledge creation, dissemination, and utilization. The understanding that scholars create academic work or knowledge, publishers disseminate it through journals or books, and decisionmakers change behaviors or policies as a result of new knowledge persists to the present day (Haley et al., 2017), despite Weiss's research that knowledge utilization is nuanced and often diffuse (1979, 1993; Weiss, Murphy-Graham, Petrosino, & Gandhi, 2008). Citing another author's work is a decision process that parallels that of policy in a sense. As a result of this inaccurate understanding, academic influence typically gets measured by analyzing proxy indicators of the decision process, predominantly citations.

Here, the belief is that by merely making knowledge available, people will accept and apply it. Quantitative research evaluation relies on citation counting and statistical analyses to determine influence (Bornmann et al., 2008; Cronin & Snyder, 1998; Gingas, 2016; Jones, 1980; Ravallion & Wagstaff, 2011; Zhu et al., 2015).

Henk Moed (2017, pp. 51–59) identifies 29 frequently used quantitative indicators of academic influence from citations to collaboration and economic impact to social media mentions. Moed organizes these indicators into eight categories based on the data sources and technologies used to create each indicator. Table 3 presents these indicators and categories. The first eighteen indicators in this list rely on counting how often a scholarly work (publication or patent) is mentioned in another auditable medium. The two reputation- and esteem-based indicators rely on subjective measures of importance. Measures of collaboration and measures of research infrastructure generally focus more on the research process than the output and its utilization. The three economic indicators focus on impact outside academia.

In this accounting, Moed provides the potential benefits of each indicator and its limitations. Most of these indicators are not normalized within or between fields and disciplines, favor the longer publishing histories of senior academics, or measure too little of a construct to be useful in a broad context. Yves Gringas (2016) suggests the limited usefulness of bibliometric indicators by decrying the rampant misuse of bibliometrics in research evaluation. The uninformed use and misuse of quantitative bibliometrics is a common thread in scientometrics publications over the past 35 years (Bornmann et al., 2008; Garfield, 1985; Leydesdorff et al., 2016; Rousseau & Rousseau, 2017).

Research evaluation generally accepts the Hirsch index (2005) as a "good" indicator of influence. However, it is a particularly problematic indicator for interdisciplinary research

Table 3

Indicators of Academic Influence Identified by Moed (2017) with Constructs Measured

Category	Measures	Constructs measured
Publication- and citation-based measures	Publication counts Citations (general) Citations per article Relative citation rate Number of top publications H-Index Integrated impact indicator	Scientific-scholarly outputs and impacts
Journal-based indicators	Journal metrics (general) Journal impact factor SNIP SJR, Eigenfactor Glanzel's negative-binomial model	Scientific-scholarly impact and communication
Patent-based indicators	Number of patents Patent citations	Societal-technological impact
Altmetrics, usage-based and web-based measures	Full-text downloads Social media mentions Readership indicators Webometric indicators	Scientific-scholarly or Societal output and impact
Reputation- and esteem-based measure	Reputation survey Scholarly prizes and awards	Scientific-scholarly impact
Economic/econometric indicators	Efficiency indicators Measures of economic value Funding related measure	Economic impact; Process indicators
Measures of collaboration, migration, and cross-disciplinarity	Co-authorships Research mobility Cross-disciplinarity	Scientific-scholarly impact, process indicators
Measures of research infrastructure	Sustainability and scale Research infrastructure Being "research active"	Input indicators

because it is both discipline-specific and favors established scholars (Bornmann & Leydesdorff, 2018; Cormode et al., 2013). The h-index might be no better a metric than the mean number of citations (Lautrup, 2006). In response to rudimentary citation indexing (cf. Chambers & Miller, 2014; Hirsch, 2005; Ravallion & Wagstaff, 2011; Truex, Takeda, & Cuellar, 2009), researchers proposed methods of determining more sophisticated measures of scholarly influence. Chief

among these are the dynamic topic model (DTM) (Blei & Lafferty, 2006) and the related document influence model (DIM) (Gerrish & Blei, 2010) (Gerow et al., 2018), as well as the scholarly capital model (SCM) (Cuellar, Takeda, & Truex, 2018; Cuellar, Takeda, Vidgen, & Truex, 2016). Kevin Crowston (2016) criticizes the SCM for simply rearranging existing bibliometric measures, misinterpreting network theory, and serious measurement issues. DTM and DIM show promise, but through their reliance on individual words as the unit of analysis, neglect to address the issues relating to lacking a "shared language" among the various disparate disciplines involved in interdisciplinary scholarship (Bauer, 1990; Bracken & Oughton, 2006; Lattuca, 2001).

Further complicating the sole use of citation data to determine academic influence is the issue of "missing citations." MacRoberts and MacRoberts (2010) found that many influences are absent in published work. In their study of citations in biogeography publications, the authors divide influence into four categories: work from sources too close to acknowledge (informal/collegial contacts and unrecognized influence), citations (works cited for various reasons), work from commonly accepted research (such as Mendel's work on genetics), and work from uncited sources. The influence of uncited sources and informal processes does not appear in auditable products; however, it still exists. Additionally, one study found that when dealing with a large number of publications, highly influential scholars have "systemically lower" influence due to random effects (Waltman et al., 2013).

The research evaluation literature generally does not discuss differences between disciplinary research and interdisciplinary research. Perhaps the most substantial evidence that there is a difference in use between disciplinary research and interdisciplinary research comes from anecdotal evidence, apocryphal stories, and strong beliefs (Callard & Fitzgerald, 2015;

Frodeman, 2017b; Klein, 2017; Lattuca, 2001). Additional evidence comes from pure logic. If disciplinary and interdisciplinary approaches create different types of knowledge, their respective paths of influence are likely also different.

Interdisciplinary Research Evaluation

The evaluation of academic work generally occurs along either qualitative or quantitative lines (Coryn & Scriven, 2008). Quantitative studies investigating the impact of interdisciplinary research examine highly cited papers (Chen et al., 2015; Larivière & Gingras, 2010; Yegros-Yegros et al., 2015) or research fronts (Okamura, 2019) in the natural sciences. Okamura finds strong evidence for a strong positive relationship between the number of disciplines integrated into a research area and total citations. However, such a relationship can be expected because more disciplines would be likely to read and cite a paper if more disciplines are discussed in a paper, depending on the publication medium and interest.

On the qualitative side are peer-review, expert judgment, and honors such as awards and prizes, while on the quantitative side is citation analysis (Jones, 1980). Determining interdisciplinary academic influence is an inherently different task than evaluating interdisciplinary research itself. Focusing on the research itself helps researchers understand and examine the phenomenon of academic influence better, but simultaneously moves the conversation away from a reliance on the prevalent forms of academic influence. Interdisciplinary research evaluation did not appear as a unified line of inquiry until Klein (2008) published a review of the disparate literature. She noted the field was emergent, international, and occurred in many disciplines. Klein developed a framework of seven principles for thinking about evaluating interdisciplinary research:

1) variability of goals

2) variability of criteria and indicators

3) leveraging of integration

4) integration of social and cognitive factors in collaboration

5) management, leadership, and coaching

6) iteration in a comprehensive and transparent system

7) effectiveness and impact (Klein, 2008, S118).

Scholars of interdisciplinary research evaluation do not limit their discussions to the research itself, however. In addition to eleven foundational principles of interdisciplinary research, Strang and McLeish (2015) identify five aspects relating to interdisciplinary research appropriate for evaluation: funding proposals, outputs, careers, institutes and centers, and national systems (pp. 12–13). For each aspect, the authors set forth several questions identifying quality markers of interdisciplinary research. The section concerned with outputs is of particular interest to the present study. While the section on careers appears relevant at face value, it deals with employers providing support for career advancements, which is outside the scope of the present study. Table 4 presents these questions relating to quality markers of interdisciplinary research, including the broad areas of concern to the authors: content, methodology, and communication.

Taliata Moreira de Oliveira and colleagues (2019) identify three concepts central to multidisciplinary, interdisciplinary, and transdisciplinary research that can be studied: the intersection of scientific subjects, knowledge integration, and collaboration aspects of research groups. These concepts mirror Klein's (2017) discussion of the various types of disciplinary interaction and partially align with Katri Huutoniemi and Ismael Rafols's (2017) association of interdisciplinary research relating to breadth, integration, and transformation. The themes

Table 4

Aspects of High-Quality Outputs from Interdisciplinary Research and Associated Themes

	Aspects	Theme
CONTENT	Does the output constitute 'more than the sum of' the specific disciplinary inputs?	New or novel conceptualization
	Are the research questions and/or hypotheses a new product of interdisciplinary collaboration?	New or novel conceptualization
	Is the background information indicative of an interdisciplinary perspective?	Integration of disciplinary perspectives
	Does the output draw, in a sufficiently balanced manner, on literature/material from the various disciplines involved (for example, via citations)?	Balanced views, breadth
METHODOLOGY	Do the theoretical discussions/contributions reflect interdisciplinary exchange and synthesis of knowledge?	Integration of disciplinary perspectives
	Does the output draw on data/materials, methods, and forms of analysis of the various disciplines involved?	Integration of disciplinary perspectives
	Does the output create novelty by the integration of established knowledge within disciplines?	Integration of disciplinary perspectives
	Has the evaluation methodology avoided the trap of insisting on necessary novelty within each discipline?	Integration of disciplinary perspectives
	Have the different scales and objects of study of the participating disciplines been successfully connected and/or integrated?	Integration of disciplinary perspectives
	Has each contributing discipline been valued equally?	Balanced views, breadth
COMMUNICATION	Does the output incorporate different disciplinary "voices" and ideas?	Balanced views, breadth
	If there is a lead "voice," does it override or enable/support others?	Equitable accessibility
	Is the output accessible to different disciplinary perspectives and (where relevant) wider audiences?	Equitable accessibility
	Is the output accessible to other audiences?	Equitable accessibility
	Does it include research user communities in an exchange of knowledge?	Equitable accessibility
	Does the output have the potential to provide transformative feedback into specific disciplinary areas?	Transformative
	Does the output address issues of impact?	Impactful
	Are authorship and disciplinary contribution credited transparently?	Transparent

proposed for the quality markers identified in Table 4 are derived from integrating these three sets of authors' views.

Novelty, integration, and accessibility are the dominant themes among Strang and McLeish's (2015) aspects of high-quality, interdisciplinary research outputs. Integration and transformation are dominant themes, along with group dynamics, to develop appropriate dimensions for evaluating multidisciplinary, interdisciplinary, and transdisciplinary graduate education and research teams (de Oliveira et al., 2019). While Huutoniemi and Rafols (2017) identify multidisciplinarity with breadth, interdisciplinary with integration, and transdisciplinarity with transformation, de Oliveira and colleagues (2019) do not. It is unclear if this is due to a fundamental difference of opinion or the difference in research targets.

A sense of impact or influence is explicitly present in Strang and McLeish's (2015) work. The authors include the creation of new or novel concepts or understanding, equitable accessibility (both inside and outside academia), transparency, and impact as dimensions of high-quality, interdisciplinary aspects requiring evaluation. Perhaps this is simply a result of their broader intent. However, by omitting a discussion on the promotion of products of interdisciplinary work, de Oliveira and colleagues (2019) and Huutoniemi and Rafols (2017) imply interdisciplinary research follows similar methods of influence as disciplinary research.

Interdisciplinary academic influence is fundamentally different from that of disciplinary research. Recent interdisciplinary research evaluations examine the aspects of high-quality, interdisciplinary research instead of turning to the quantitative analyses offered by scientometrics. The above qualitative studies have brought to light four desirable qualities of interdisciplinary research, which I term "integration," "impact," "equity," and "transparency." "Integration" necessarily requires blending perspectives from at least two disciplines in a

balanced way. "Impact" addresses the inherent transformative nature of interdisciplinary research to stakeholders and other communities of interest. The transformative nature of impact implies moving beyond accountability to fostering instrumental use. "Equity" relates to the accessibility of the research to a broad set of social actors, including academics, practitioners, and directly impacted groups, and ensuring a broad, non-discipline-specific audience can understand the research. Finally, "transparency" refers to performing and documenting the research in an auditable way.

Recent investigations of interdisciplinary research focus on more recent studies for which there is documentation of the research process and the ability to interact with the authors. While this may be sufficient at determining recent high-quality, interdisciplinary research, the process is not necessarily possible for older research. Exploring appropriate means of identifying qualities of "good" interdisciplinary research is necessary to examine the influence of Weiss's scholarship.

Summary

The use, and misuse, of citation data dominates measures of academic influence. The implicit belief is that quantifying influence is preferable. However, citations are merely an easily auditable instance of academic influence. The proper use of citation data relies on applying a theory of citation that aligns with the research question and studied phenomenon. The sociological theory of citation holds that citing another's work recognizes a work's importance and quality. The link between quality and citations is tenuous, and the meaning of a citation varies over time. Studies of citation behavior in the social sciences and humanities suggest applying citation mapping, rather than citation counting, provides a more accurate understanding of the phenomenon. Citation behavior within disciplines is understood to be relatively stable; however, as separate social groups, each discipline has distinct citation behaviors. The high level

of interaction between disciplines in the social sciences, combined with issues comparing citation patterns in different disciplines, makes determining the academic influence of interdisciplinary work difficult. In response, recent research focuses on understanding which aspects of interdisciplinary research are indicative of high quality. Novelty, balanced integration of disciplines, and accessibility to broad audiences are the dominant themes of high-quality, interdisciplinary research. Based on the existing literature, I propose "integration," "impact," "equity," and "transparency" as the hallmarks of good interdisciplinary research. The next chapter describes the present study's methodological aspects that expand the evaluation toolbox for interdisciplinary research.

CHAPTER III

METHODOLOGY

The present study aims to empirically identify and examine the influence of Carol Hirschon Weiss's scholarship on academic discourse. Creating a systematic map of Weiss's work and the documents that cite her writings permits a deeper understanding of the relationships between empirically derived categories. Systematic mapping extends beyond identifying the disciplines that cite Weiss's publications, as was done in prior analyses (Heberger et al., 2010; Newcomer, 2015). Qualitative in nature, the systematic map developed in this study illustrates qualities of Weiss's scholarship that are believed to be related to citation behavior in various disciplines. The qualities examined are:

1) the type of publication;

2) the domain addressed; and

3) the focus of the publication (methodology, theory, research results, or reflecting on other work or practice).

Examining these qualities helps develop an understanding of which qualities may influence citation behavior related to Weiss's interdisciplinary work.

The balance of this chapter presents the methods, processes, and procedures followed in the study. First, I explore my role as the qualitative researcher of documents. Then, I reiterate the research questions guiding this study. A discussion of the research design comes next, which outlines the systematic mapping process using recent similar studies as a guide. An explanation of the four phases of data collection follows. The procedures used to identify Weiss's entire body of work come first, including the sources and search strings and inclusion and exclusion criteria

specific to this systematic mapping process. Details of the data collection instruments appear in this section. A description of the method used to gather and create data for the three quality categories follows. Next, I describe the process used to collect citation data, including the sources and challenges encountered. A discussion of the data required to answer each research question and the associated analysis comes next. Then I review the trustworthiness and limitations of the process and the data. Lastly, I summarize the methodological aspects of the present study.

Role of the Researcher

Qualitative analysis often focuses on working with interactive and reactive data sources, such as interviewees, observed behaviors, and focus group participants. Documents are a rich source of low-cost, non-reactive, easily accessible information. Further, in addition to textual and content analysis, documents also allow the collection of supplementary and contextual data (Lincoln, 1980, as cited in Tight, 2020). In many studies, documents are one source of data in a broader qualitative triangulation design (Bowen, 2009). Still, documents can be the sole source of data in grounded theory research (Corbin & Strauss, 1990; Glaser & Strauss, 1967; Pandit, 1996; Tight, 2019, 2020). Two grounded theory traditions are present in the literature: the systematic, pragmatist approach (Bryant, 2017; Corbin & Strauss, 2008; Glaser & Strauss, 1967) and the constructivist approach (Charmaz, 2014). The present study follows in the systematic, pragmatist tradition of grounded theory because the analysis is on the document level, not line-by-line or data fragment. A document-level analysis is appropriate because this study uses citations of Weiss's work as a means of auditing influence. Citations typically cite the entire document, not a line or fragment or section. Determining which part of a document is being cited requires either intensive textual analysis of both the cited and citing documents or a direct

quotation to examine. In the context of this study, more than fifteen thousand books, journal articles, and book chapters would need to undergo a detailed textual analysis by hand to identify which part of Weiss's publication is being cited. Further, line-by-line and data fragment analysis is more appropriate for data from interviews and focus groups, whereas data immersion analysis is more appropriate to document-level studies (Rieger, 2019).

Using terminology from more common qualitative analysis applications, the "participants" in a qualitative study of this nature are the documents. Because gathering data from and about documents involves increasing levels of interpretation and abstraction, the orientation or "relationship" a researcher has concerning the documents remains relevant (Cresswell & Poth, 2018). Much like Weiss herself, most of my academic work is in policy analysis, evaluation, and public administration. Having an academic preparation similar to Weiss influences the interpretations and decisions I made during coding (Marshall & Rossman, 2015). Further, I have great respect for Weiss's work and find a particular affinity for Weiss's observations and conclusions. However, respect does not equate to blind acceptance of her findings or the lack of a critical approach to the present study.

The researcher's ability to successfully and correctly execute the study is also of particular concern in qualitative analysis. Throughout my academic and professional training, I participated in eight studies involving iterative coding procedures and four systematic reviews (Coryn et al., 2020; Coryn et al., 2017; Schröter et al., 2020; Schröter et al., 2015). These experiences provided me with the requisite knowledge and expertise to conduct a study of this nature successfully.

Research Questions

Developing appropriate methods for evaluating the influence of interdisciplinary research requires a better understanding of the phenomenon itself. Research evaluation broadly accepts the use of both peer judgment and citation analysis as indicators of academic influence. Contemporary studies show a heavy reliance on bibliometrics to evaluate research. Yet, bibliometric analyses are inadequate to measure interdisciplinary research due to their intrinsic intradisciplinary biases. Bibliometric analyses rely on within-discipline comparisons to identify influence, using either the raw citation count or a statistical manipulation of raw counts as instances of influence. In bibliometric analyses, each discipline or field is a separate insular society. Attempting to use bibliometric analyses to identify interdisciplinary influence ignores the fact that no united community of academics exists that holds one set of preferred question types questions, methodological norms, and acceptable areas of study.

Rather than following the quantitative path, the present study qualitatively examines aspects of Weiss's writings that are thought to lead to her work being influential in various disciplines. Recent qualitative interdisciplinary research evaluation studies assess the research process with the study's authors to determine quality markers. Such inquiry is not always possible historically, and findings from the investigation might not explain the endurance of Weiss's influence over the past fifty years. Understanding which aspects of Weiss's scholarship are influential is a step along the path of developing appropriate methods for evaluating the academic influence of interdisciplinary scholarship. The research questions guiding the research presented in this dissertation are:

1) What is the size and scope of Carol Hirschon Weiss's scholarship?
    a. What are the published and unpublished works?

b. What empirically grounded categories or types appropriately describe domains/themes in Weiss's scholarship?

c. How do these categories interact (e.g., align, intersect) with one another?

2) Which disciplines cite which individual works?

a. To what extent is Weiss's work cited in various disciplines?

b. To what extent are Weiss's publications that focus on methodology, theory, and research results dissemination cited in various disciplines?

c. What other patterns or trends are observable in the citations?

Research Design

Multiple methods of summarizing the literature on a topic exist. Narrative reviews, including literature reviews, were the dominant knowledge synthesis method until the 1990s (Cooper, 2016). Literature reviews are common both as part of a study and as stand-alone works. Narrative reviews are the subject of frequent criticism in a presumed hierarchy of research that ranks quantitative methods as more rigorous than qualitative methods (Greenhalgh et al., 2018). Narrative reviews focus on synthesizing and critiquing existing research (MacLure, 2005), while systematic reviews focus on summarizing information from disparate studies either by aggregation or configuration (Gough et al., 2012). The number and types of systematic reviews of published literature increased substantially during the past thirty years. The proliferation resulted in a confusion of terminology and a lack of clarity in the number and type of review methodologies (Gough et al., 2019; Gough, Thomas, et al., 2012). For consistency and clarity, I followed the definitions provided by Gough and colleagues (2012).

The most common methods used in non-narrative review studies are meta-analysis, systematic review, and systematic mapping. Each method is ultimately concerned with resolving

the uncertainty created by conflicting research results. However, these three methods have individual purposes, associated types of questions, and underlying sets of theoretical and ideological views. Meta-analysis is a statistical analysis that synthesizes available research on a topic, usually in terms of effect sizes (Borenstein et al., 2009). Meta-analysis aims at increasing statistical power and improving estimates of effects. Much like meta-analysis, systematic reviews focus on quantifying aspects, though the intent is not necessarily aggregation of results (Gough et al., 2012). Systematic review and systematic mapping have similar methodological roots in that both focus on describing various aspects of studies.

The purpose of describing and characterizing studies is to provide an account of the qualities present in documents. Oliver and Sutcliffe (2012) identify six reasons for describing studies, whether as part of a systematic review or an independent investigation. First, describing the studies or documents being examined eases the management of a systematic review. Additional reasons relate to operational research tasks: accumulating a body of literature, developing inclusion and exclusion criteria, collecting data for quality and relevance determination, and gathering aspects of interest for synthesis. The remaining purpose of describing studies is to create a map, either to describe the nature of a field, to inform the conduct of a synthesis, or to interpret the results of a synthesis (ibid, p. 137). While the first five reasons are closely tied to systematic review tasks, creating a map is not implicitly linked to performing a systematic review.

Three of the above purposes were relevant to the present study: accumulating a body of literature, creating a map to describe the nature of a field, and gathering data for quality and relevance appraisal. The first step in developing a better understanding of the academic influence of Weiss's work is accumulating the entirety of her scholarly writings. Second, categorizing

Weiss's work develops systematic and comprehensive knowledge about the topics she discussed. Lastly, qualities or aspects of Weiss's scholarship thought to be influential must be gathered to further our understanding of interdisciplinary academic influence. All three purposes are simultaneously achievable by employing a systematic mapping methodology (Bates et al., 2007; Gough et al., 2003; Gough et al., 2012, 2019; Oliver & Sutcliffe, 2012).

Systematic mapping is the dominant qualitative method of review due to its goal being the thick description of a research area (Bates et al., 2007). Systematic maps aim to uncover interdisciplinary connections, illustrate current research boundaries, and illuminate topics needing further investigation. Systematic mapping methods are useful for reflexively identifying and examining multiple aspects of documents that constitute a body of literature. Commonly used characteristics are geographic distribution, methods, participants, policy context of the intervention, theoretical approach, and bibliographic data, including the number and affiliation of authors (Oliver & Sutcliffe, 2012, p. 142). Systematic maps allow researchers to explore relationships between different features of documents (Gough et al., 2003).

This study's systematic mapping process looks at one scholar's body of work rather than one field's body of work. The same logic applies to both applications, uncovering linkages rather than results by examining various qualities in the works studied (Cooper, 2016). The methodology was pioneered by the Evidence for Policy and Practice Information and Co-ordinating Centre at the Institute of Education, University of London (Peersman, 1996) and more recently applied in diverse sectors, including student learning (Gough et al., 2003), adult mental health care (Bates et al., 2007), software engineering (Petersen et al., 2015), environmental sciences (James et al., 2016), social cognition mediation (Fernández-Sotos et al., 2019), customer

loyalty and brand management (Tartaglione et al., 2019), public engagement in governance (Schafer, 2019), and connected health (Karampela et al., 2019).

Various studies suggest slightly different methods of systematic mapping. For Salina Bates and colleagues, the process of systematic mapping consists of at least seven steps (2007). Depending on the study domain, the screening step may expand to include an initial pass of screening titles and abstracts, retrieving full papers, and then screening the full papers bringing the number of steps to nine. More recently, others define the process through six or seven steps by combining steps offered by Bates and colleagues and adding other aspects of the coding process (James et al., 2016; Karampela et al., 2019; Petersen et al., 2015), while others whittle the process to three tasks (Fernández-Sotos et al., 2019). Table 5 illustrates the various steps or tasks of systematic mapping and the sections of a typical dissertation that address each step.

Table 5

Comparison of Traditional Methods Sections with Systematic Mapping Frameworks

Typical dissertation section	Bates et al. (2007)	Petersen et al. (2015)
Research questions	Identifying a research area	Research questions
Sampling	Developing inclusion and exclusion criteria Screening	Broadly search using identified search terms Selection (inclusion and exclusion criteria)
Instrumentation	Keywording or Coding	Classification
Procedure	Retrieving and managing information Cleaning data	Data extraction
Data processing and analysis	Analysis	Analysis
Limitations	*(not addressed)*	Validity checking

Variability related to the identification and number of steps reflects the flexibility of the systematic mapping method. The present study follows methods used in recent systematic mapping literature, specifically the process outlined by Kai Petersen and colleagues. Petersen's

method was chosen because it was a methodological influence in the five more recent studies mentioned above.

The present application of systematic mapping is ultimately rooted in grounded theory. In systematic mapping, data analysis co-occurs with data collection, and the categories are related and developed during the research. The same aspects are true of grounded theory (Corbin & Strauss, 1990). The iterative process of developing codes empirically rather than *a priori* is also a hallmark of grounded theory and systematic mapping. Some *a priori* codes are present in this systematic mapping process but were used as a starting point and are derived from others' analyses of Weiss's work. Glaser (1978, 1992) cautions against using *a priori* categories due to the potential bias from prior knowledge of a topic, whereas Corbin and Strauss (2008) and Bryant (2017) allows space for *a priori* categories grounded in the literature and existing research.

Data Collection

Data collection occurred in four phases. The first phase consisted of identifying and cataloging all Weiss's unpublished and published documents. The first phase resulted in a list of Weiss's unpublished writing, including an analysis of which documents were related to one another in the unpublished archives, and a bibliography of Weiss's publications (see Appendices A and B respectively). The second phase involved reading, coding, and categorizing each of the documents identified during the first phase. The coding process contained an initial open coding followed by two iterations of code refinement and a final iteration of theoretical coding (Glaser, 1978, 1992). A typology of Weiss's publications was the product of this phase (see Appendix C). The third phase of data collection included identifying the discipline in which Weiss's work was published. This phase involved extracting the journal or book title from all Weiss's publications

and identifying the corresponding subject category in Ulrichsweb, Library of Congress Subject

Headings, or other appropriate indexes, which resulted in another typology (see Appendix D).

The fourth phase of data collection involved gathering the complete list of documents citing any

of Weiss's work indexed through Google Scholar, Web of Science, and Scopus and extracting the

necessary discipline information.

Instrumentation

All data were recorded in Excel spreadsheets during the collection process. Data from the

first three phases were collected and saved into a single Excel spreadsheet. Table 6 displays each

column heading and information source in the Excel spreadsheet. The document number was a

means of creating a unique identifier for all related conceptual works. The numbers were

assigned beginning with Weiss's first publication and continuing sequentially for each document.

After the initial publication of a document, additional printings have the same whole number and

a sequential decimal assigned chronologically. For example, an initial publication in a journal

might be assigned the number 8. A subsequent publication in an anthology would be assigned

8.1, and a further reprinting would be assigned 8.2. The document/publication/work column

included the full citation of each publication. The year refers to the year of publication –

separating the year from the citation allowed for a more precise differentiation of multiple

publications of the same document. For the three qualities of interest, I developed a coding

system for the type, domain, and focus of each document. The coding process, including the

iterative process of code creation, refinement, and finalization, is detailed in the coding section

below. For citation data of works citing Weiss, the information recorded by each indexing source

was downloaded in its raw format (comma-separated variables) and imported into Excel. Each of

Weiss's publications had a unique spreadsheet, and each database queried had a separate

workbook.

Table 6

Coding Database Column Headings and Data Sources

Column Heading	Data Source
Document number	Created by the author
Document/Publication/Work	Gathered from library holdings and Weiss's archive
Year	Gathered from library holdings and Weiss's archive
Document type	Created by the author
Domain	Created by the author
Focus area	Created by the author
Additional description	Created by the author
Ulrich's domain 1	Ulrichsweb (online serial publication database)
Ulrich's domain 2	Ulrichsweb (online serial publication database)

Sampling

The study examined the entire population of Weiss's work, published and unpublished;

therefore, no sampling occurred. The focus of this study was the breadth of Weiss's influence in

academic writing. Studying a sample of Weiss's writings could potentially leave out important

work in one field, thereby misrepresenting Weiss's breadth of influence. At the start of the study,

I presumed that Weiss did not pen more than 200 unique publications and elected to examine the

entirety of her scholarship. Though no sampling of Weiss's publications occurred, the need for

inclusion and exclusion criteria became evident during the coding process.

Cataloging Carol Hirschon Weiss's Body of Work

Data related to Weiss's unpublished documents were gathered from her archives housed

at the Interdisciplinary Ph.D. in Evaluation program at Western Michigan University. Data on

Weiss's publications were collected from her archive and through exhaustive searches of the

libraries at Cornell University, Harvard University, The University of Melbourne, and Western

Michigan University. Following procedures identified through consultation with librarians at each institution, the author search function was used, with the specific search terms: "Carol Hirschon Weiss," "Carol H Weiss," "Carol Weiss," "C Weiss," and "C H Weiss." Though logically, some of these terms are a subset of others, each search term produced at least one unique record due to the nature of specific indexing protocols and database errors.

The library databases included the necessary citation information to locate any documents cited in work by Weiss or other authors. Mentions of Weiss's work in the legislative or judicial records are not included in this study, as they were instances of political or social influence, not academic influence, as defined in chapter 2. Citations present in unpublished dissertations are not included because these are generally not part of the same sort of "academic conversation" as published works.

Weiss's Unpublished Work

Shortly after Weiss's passing in 2013, Western Michigan University's Interdisciplinary Ph.D. in Evaluation (IDPE) program received Weiss's files from Dr. Belle Brett, a student, mentee, colleague, and friend of Weiss (personal communication, August 16, 2016). Conversations with the university archives at Cornell University, Columbia University, Harvard University (including The Harvard Graduate School of Education Library and the Schlesinger Library), and a member of the Weiss family (Janet Weiss, personal communication, December 15, 2016) revealed that no other institution holds any unpublished archival documents for Weiss except her thesis and dissertation. Therefore, the unpublished works housed at the IDPE account for the entirety of Weiss's unpublished works that are known. The archive includes a majority of her publications (1965-2001) and various drafts, discussant notes, partial manuscripts,

correspondence, and other written documents. There are often annotations on proposed changes in the earlier drafts for documents that were revised and republished.

Weiss's archive includes five folders containing work presumed to be unpublished at the start of this study. Each page was copied and digitized, maintaining both the order and grouping of each document to preserve the original documents while permitting annotation during cataloging. Some of Weiss's unpublished work is typed or word-processed, allowing for efficient review of the contents and text-recognition of the scanned files. Handwritten work, including annotations on typed or word-processed work, comprises roughly half the unpublished material. Of the 34 documents in the five folders, thirteen are typed, and thirteen are handwritten, while eight additional documents are typed but are the work of other authors. While cataloging the unpublished documents, it became clear that most of the documents were earlier drafts or closely related to some of Weiss's publications. Three documents were related to the article, "What America's Leaders Read," (Weiss, 1974) and the American Leadership Study Survey that was undertaken at the Bureau under Allen Barton. Nineteen documents were related to Weiss's study what she called "research drift" in federal policy, specifically the article, "Research for Policy's Sake" (Weiss, 1977a), her unpublished dissertation, *The Usefulness of Social Research for Decision-making in Mental Health* (Weiss, 1977b), and the edited volume, *Using Social Science Research in Policymaking* (Weiss, 1977c). Eleven documents were related to the article, "Media Report Card for Social Science," (Weiss, 1985) and the book, *Reporting of Social Science in the National Media* (Weiss & Singer, 1988). Documents related to these three projects were in individual folders. The remaining document was not in a folder and is an unpublished draft from 2000: "The Policy-Making Process in a State Board," which has the note "MCAS policy article 2" handwritten in the corner.

Weiss's Published Work

In addition to the publications found in Weiss's archive, an exhaustive search of four university library databases occurred. The libraries at Columbia University, Harvard University, The University of Melbourne, and Western Michigan University were searched using the search strings identified earlier. Again, these were: "Carol Hirschon Weiss," "Carol H Weiss," "Carol Weiss," "C Weiss," and "C H Weiss." The rationale for choosing these databases is both intentional and pragmatic. Weiss worked for over a decade at the Bureau of Applied Social Research at Columbia University; thus, many of her early publications are directly linked to her work there. *The Guide to the Bureau of Applied Social Research* (J. S. Barton, 1984) contains a comprehensive list of all published and unpublished documents related to the Bureau archived with Columbia University Libraries. Weiss also obtained her doctorate from Columbia University, and her unpublished dissertation is housed there. After leaving Columbia University, Weiss spent the remainder of her career at The Harvard Graduate School of Education. Archives at Harvard University, The Harvard Graduate School of Education, and Schlesinger Library were all searched for any mention of Weiss. The library databases at The University of Melbourne and Western Michigan University provided an external view of Weiss's work. Both universities have renowned centers focusing on evaluation and employed the author during his dissertation research in various capacities. Searches in these two databases led to identifying publications not indexed at either Columbia University or Harvard University.

During the process of reviewing reference lists of Weiss's publications and the documents citing Weiss's publications, I discovered four additional documents not indexed by the university libraries or in Weiss's archive. One of the documents was a chapter from the 1972 edition of *Evaluation Research: Methods for assessing program effectiveness* reprinted in another book

(1977d). The three other were unique documents: a book chapter (2007b), and two are

documents related to Weiss's work with the International Development Research Centre (1999a)

and UNESCO's Management of Social Transformations (MOST) Programme (2003).

Categorizing Carol Hirschon Weiss's Body of Work

Prior research provides empirical evidence that some citation behavior is related to non-

content or "superficial" aspects of a document (Bornmann, 2013; Halevi & Moed, 2013;

Tahamtan & Bornmann, 2019; van Wesel et al., 2014). Until now, Weiss's work has been

categorized exclusively by its content, specifically "path-breaking contributions" (Mathison,

2005, p. 449), the broad questions investigated (Newcomer, 2015), and aspects that differentiate

Weiss from other evaluation theorists (Weiss, 2004, 2012a). Yet, qualities of the documents, such

as type, domain, and focus, also play a role in citation behavior. To dig deeper into these

qualities, I started with *a priori* categories for each quality: type, domain, and focus (see Table

7). Rather than being prescriptive categories, the *a priori* categories were an aid in

operationalizing type, domain, and focus. In the following paragraphs, I explain the thinking

behind examining these three qualities and operationalize the terms before continuing to describe

the coding process.

Table 7

A Priori *Codes for Type, Domain, and Focus of Document*

Type of document	Domain of the document	Focus of the document
Article	Evaluation	Methods
Book	Knowledge Utilization	Research
Chapter	Public Policy	Theory
	Other	Other

"Type of document" referred to the kind of document such as monograph, manuscript,

book, journal article, research report, interview, book review, and so on. Historically, researchers

in the social and behavioral sciences tended to cite books and journal articles in equal proportion (Larivière et al., 2006) or rely more heavily on books and book chapters (Soós et al., 2018). Recent work suggests the social and behavioral sciences generally cite more journal articles than books between 2005-2014 (Gingras & Khelfaoui, 2019; Soós et al., 2018). This time frame differs substantially in both scope and citation practice than the duration of Weiss's career. Jeffrey A. Knapp (2013) found a similar trend in recent political science dissertations at Penn State University. However, books remained more commonly cited than periodicals for all periods if one combines books and book chapters in Knapp's analysis. Journal citations in natural sciences regularly exceed 80% of total citations (Bornmann et al., 2008). Despite recent trends, no study to date shows journal article citations exceeding 80% of total citations in any social science (Soós et al., 2018). Therefore, the historical finding that social sciences rely heavily on books and book chapters reinforces the inclusion of a "type of document" quality. The "type of document" categories were refined and finalized during the development of inclusion and exclusion criteria as the type of document was identified.

"Domain of the document" referred to the general subject matter at hand in a document. Domain addressed disciplinary context and was operationalized as the document's location in disciplinary literature rather than merely "discipline." The distinction permitted categories that were grounded in Weiss's own words and understandings of concepts. The *a priori* categories under domain were the fields in which Weiss is widely influential, as described in chapter 2. I detail the grounded theory approach to deriving the "domain of the document" categories below in the coding section.

Lastly, the "focus of the document" addressed whether a document focuses on theory, methods, results, a combination of these, or some other aspect of the research process that might

play a role in citation behavior. Distinguishing between the various foci of publications was initially put to me by Janet Weiss (personal communication, February 27, 2017). When I started to look into the literature on what type of document gets cited, I was surprised by the paucity of empirical research. Andrew J. Chapman (1989 as cited in Posner, 2000) offers a distinction between citation behavior of papers that focus on methods and those focusing on results. One of Chapman's twenty-five concerns about using citation counts as an indicator of impact was the "spuriously inflated" number of citations of methods papers. Gali Halevi and Henk Moed (2013) provide one of the few empirical analyses of citation behavior by document section, but the authors base the analysis on citations within a discipline and outside a discipline. Logically, papers that espouse particular methods or theories would be frequently cited in literature reviews and methods sections in any publication, whereas a discussion of other studies' results might appear less often. Including the "focus of a document" quality allowed me to examine this notion.

Coding

Broadly, I pursued an iterative thematic coding procedure (Miles et al., 2013; Saldaña, 2012). Many qualitative data analysis computer software packages exist to assist researchers with qualitative analysis. In prior coding experiences, I used MAXQDA to aid in qualitative analysis. ATLAS.ti, RDQA for R, and NVivo are other popular qualitative analysis software packages. However, coding for this study relied on traditional material methods (Maher et al., 2018), including paper, index cards, color coding, and the like. Cresswell and Poth (2018, p. 211) offer five questions to determine whether a computer-aided analysis is appropriate for a particular study. One question addresses the quantity and type of documents to be analyzed. Two issues presented themselves for the use of computer-aided analysis in the present study. First, the

analysis was at the document level. Not all Weiss's documents are digitized, most notably none of her books, many book chapters, and some of her papers from the National Center for Education Leadership. Using coding software would necessitate digitizing these documents. Second, the population of interest was reasonably small (250 documents). These factors led me to use traditional material methods for the analysis.

The catalog of Weiss's publications was complete before coding started. Documents were not organized in any particular order in the Excel spreadsheet; meaning reprints were not necessarily located near one another. I reviewed each document in the order it occurred in the spreadsheet. For example, the initial printing of Weiss's report, *Organizational constraints on evaluation research* (1971a), and each printing of the condensed version, "Between the Cup and the Lip" (Weiss, 1973a, 1973b, 1974a, 1977a), was reviewed separately and nonsequentially. Having multiple printings of some documents included in the review process introduced a natural means of determining intrarater reliability later in the coding process. No statistical calculations were calculated for this measure because I (fortunately and unexpectedly) had perfect agreement for the coding of each printing for focus and domain. Understandably, type varied based on the publication mode, i.e., reports condensed into articles and articles later printed as book chapters had different codes for "type of document." Similarly, the Ulrichsweb subject category varied based on the venue of publication.

Coding consisted of at least three reviews of each document, more for documents that were reprintings. For the first review, I read each document in its entirety and recorded initial, open codes for the document's type, domain, and focus. The open codes (Corbin & Strauss, 1990; Cresswell & Poth, 2018) were recorded in an Excel spreadsheet that included full citations for each document listed in the catalog. Next, I examined the initial set of open codes for

opportunities to combine or divide codes in a process Glaser (1978) calls theoretical coding. Corbin and Strauss (1990) differentiate the process into axial coding and selective coding while admitting there is little difference between the two characterizations. I began the second review of each document after developing a set of theoretical codes from the open codes. The process of developing theoretical codes is explained in detail in the following paragraphs. During the second review, I replaced the open codes in the original spreadsheet with the theoretical codes and verified the understanding developed for the theoretical codes aligned with the original data. For the third review, I started with the catalog of Weiss's publications and coded each document using only the theoretical codes as options. The third review acted as a check on intrarater reliability. The third review occurred one month[2] after completing theoretical coding. Unlike the first and second reviews, the third review relied solely on the document's title and the published abstract, summary, or synopsis. Many of Weiss's published articles lack a published abstract, and I used the first few paragraphs of a document in those cases. To test the intrarater reliability, I calculated Cohen's kappa for each of the theoretical domain codes. Interpretation of the kappa statistic for this study illustrated "near-perfect agreement" (Landis & Koch, 1977) between the second and third reviews (see Appendix E).

During the first review, I identified twelve categories for the type of document, ten codes for the domain of the document, and nine codes for the focus of the document (see Table 8). Placing the open codes together in the same table illustrates the overlap among open codes for the three qualities during this phase. The codes appearing in more than one column are in bold.

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[2] Waiting one month was a function of my teaching duties rather than for some methodological reason.

Table 8

Open (Initial) Codes for Type, Domain, and Focus of Document

Type of document codes	Domain of document codes	Focus of document codes
Article	**Book review**	**Book review**
Autobiography	Decision-making	Correspondence
Biography	Education and evaluation	**Discussant notes**
Book	Evaluation	**Interview**
Book chapter	Evaluation use	Methods
Book review	Evidence-based practice	Methods & theory
Conference paper	**Interview**	Reflection
Draft	Methodology	Research results
Discussant notes	Policymaking	Theory
Evaluation report	Policymaking and the media	
Interview		
Unpublished		

The codes "book review" and "interview" were present in all three open code sets. "Discussant notes" was present in the codes for both type and focus. The overlap of open codes among the type and focus qualities necessitated a reexamination of my operationalization and understanding of both qualities. To differentiate between type and focus qualities, I chose "type" to address the mode of publication or format while "focus" addressed topical content. The clarification removed "book review" and "interview" from both the focus and domain qualities and necessitated the creation of two sub-categories of "article" in the type quality. The inclusion of two subtypes of articles ("book review" and "interview") reflects that book reviews and interviews, though published as articles, have formats and purposes distinct from traditional articles. The codes for "autobiography" and "biography" were removed because they address content, not publication mode. Documents related to the four open codes referring to unpublished manuscripts (conference paper, draft, discussant notes, unpublished) were removed from the analysis after open coding. Unpublished work lacked the necessary additional data (e.g., external domain designation, citation counts, indexing, etc.) for further analysis.

Similarly, some open codes for "focus" referred to the type of document rather than the focus of the document. To resolve this issue, I combined the codes "book review," "correspondence," "discussant notes," "interview," and "reflection" into one code: "review." Each of these documents focuses on reviewing or reflecting on prior work. As I was coding, I came to realize that critiquing others' work amounts to a sizeable portion of Weiss's writing, which is unsurprising because peer review and critique are integral to academic conversations. Table 9 provides the theoretical codes for the type and focus of document qualities.

Table 9

Theoretical (Final) Codes for Type and Focus of Document

Theoretical codes for the type of document	Theoretical codes for the focus of the document
Article	Methods
Article – Book Review	Methods & Theory
Article – Interview	Research
Book	Review
Chapter	Theory
Report	

Developing functional codes for the quality "domain" presented challenges not solved by a simple refinement of operationalization. Table 10 displays the codes developed during each iteration of coding. The open codes were too broad and included overlapping and nesting. For example, "policymaking in the media" logically is nested under "policymaking." The second iteration of coding led to a slight increase in the number of codes, the addition of a code for "other," and additional confusion about what "domain" addressed. I decided to limit the "domain" quality to codes derived from the language Weiss used in her publications. Citation data gathered for each document approximated the traditional discipline of each document. Therefore, the codes for domain intentionally do not include traditional disciplines such as

Table 10

Domain of Document Category Progression

A priori Codes	Open Codes	Iterative Codes	Theoretical (Final) Codes
Evaluation	Book review	Criminal justice	Evaluation
Knowledge utilization	Decision-making	Decision-making	General evaluation
Public policy	Decisions	Education	Politics of Evaluation
Other	Education and evaluation	Evaluation	Stakeholder approach to evaluation
	Evaluation	Evaluation use	Theory-based evaluation
	Evaluation use	Interviewing	Evaluation use
	Evidence-based practice	Knowledge utilization	Knowledge Utilization
	Interviews	Politics	Decision-making
	Methodology	Politics of evaluating	Evidence-based policymaking
	Policymaking	Public policy	Policymaking
	Policymaking and the media	Policymaking	Research utilization
		Research utilization	Social science in the media
		Science & media	Methodology
		Stakeholder approach	Interviewing
		Theory-based evaluation	Methodological issues
		Training	Surveys
		Use/Utilization	Reflections
		Other	

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criminal justice, education, political science, public administration, and so on. When working on the iterative codes, I discovered every document with an "other" designation was a reflection on Weiss's work (typically in the form of an interview) or the work of others (usually in the form of a book review). Therefore the "other" code was renamed "reflections." Using "reflections" also created a distinction for "focus of the document" and "domain of the document." Natural groupings appeared among the iterative codes. Perhaps unsurprisingly, the *a priori* codes of "evaluation" and "knowledge utilization" address many of Weiss's publications. These are the two areas Weiss studied (Janet Weiss, personal communication, December 15, 2016). Weiss's remaining work nests easily under major codes, "methodology" and "reflections." The presence of a group of publications focusing on methodologies was unsurprising as it reinforces the placement of Weiss on the "methods branch" in the evaluation theory tree (Alkin & Christie, 2004).

Three documents provide an exception to the coding procedure explained above. As mentioned earlier, I discovered three additional documents while collecting citation data in Scopus. Type, focus, and domain designations for these three documents occurred separately from the rest of the data. These three documents only underwent the third stage of coding.

Discipline and Citation Data

The purpose of gathering citation data was to understand the breadth of Weiss's influence in the context of disciplines. The sociological theory of citations holds that a citation is a recognition of scholarly merit and, therefore, a reasonable means of measuring influence. By extension, a citation in a discipline is a proxy for influence in that discipline. Citation data provides an external view, whereas the "domain of the document" provides a look at Weiss's scholarship from within the documents.

Concerns Regarding Subject Categories

The assignment of a document to a subject category is part of the indexing process. Whether human or machine-based, the indexing processes introduce errors or "indexer effects" (Azoulay et al., 2017). First, the subject category assigned to a publication might not apply to all constituent parts of an edited book or a periodical. Presumably, there is a link, but it may be tenuous. Boyack and Klavans (2011) caution journals are not sufficiently disciplinary-oriented to warrant being assigned to a discipline. Second, publishers request specific subject designations to be associated with their publication (Ex Libris, 2018). Therefore, a subject category is a function of both marketing (driving sales) and indexing (retrieving information). Third, categorizing and indexing are usually only performed once per document, meaning anachronistic meanings and biases can persist and complicate properly indexing interdisciplinary fields (Howard & Knowlton, 2018). Despite these issues, using subject categorizations from Web of Science or Scopus as a proxy for discipline is "best practice" in bibliometric research heedless of the imprecise nature of subject category assignment (Bornmann & Leydesdorff, 2018; Kim, 2019; Leydesdorff & Bornmann, 2016).

The organization performing the indexing typically uses a proprietary list of categories. Examples of indexing services are the United States Library of Congress, ISI Web of Science, Google Scholar, Ulrich's Global Serials or Ulrichsweb, Scopus, PubMed, and individual large library systems. The three most commonly used citation data sources are Google Scholar, Scopus, and Web of Science Core Collection (Gusenbauer, 2019; Li et al., 2010; Martín-Martín et al., 2018; Meho & Yang, 2007). Unfortunately, no single set of subject categories uniformly applies to all Weiss publications.

Citation Data Collection

For documents authored by Weiss, I selected the subject categorizations developed by Ulrich's Periodical Directory. Ulrichsweb, the online version of Ulrich's Periodical Directory, is the most comprehensive catalog of periodicals historically and the most appropriate source of discipline data for this study (Edward Eckel, WMU Librarian, personal communication, January 21, 2019). I gathered subject category data by searching for the publication title in Ulrichsweb and recording the subject categories in a flat file. All articles published in a particular journal were presumed to be related to that discipline.

Library of Congress Subject Headings were collected for documents not published in a journal or other serial publication. Some publications are cataloged with no subjects listed. Similar to the data from Ulrichsweb, all the subject categories are included except for the following aspects: designation as case studies, congresses, handbooks, and so on; descriptions of location, for example, United States, European countries, and developing countries. Ulrichsweb subject categories were based initially on Library of Congress Subject Headings, and the two schemes remain closely related to one another (Ex Libris, 2018), allowing for the combination of these two subject classification systems.

Before gathering citation data for this study, I presumed Google Scholar, Scopus, and Web of Science Core Collection had similar coverage of journal articles with the caveat that there would be differences between publishers. Additionally, books published before widespread internet dissemination might understandably not be indexed appropriately, if at all. I originally intended to gather citation data from all three sources to triangulate the full breadth of Weiss's influence. However, the databases' strengths and limitations suggested a more efficient, though

less extensive approach. Table 11 displays the pertinent information regarding the breadth of indexing of each database.

Google Scholar provides the broadest coverage in sheer number, but their data collection processes are not transparent. Further, Google Scholar does not cross-reference its data, which results in duplicate entries, incorrect information, inferior citations, and other issues such as incorrect attributions and citations.[3] Despite being transparent and cross-referenced, Scopus and Web of Science directly index less than one-third of Weiss's scholarly output. The difference in coverage of Weiss's publications roughly mirrors the proportions of items indexed in each database. Initially, I assumed the smaller number of indexed documents in Scopus and Web of Science would force reliance on Google Scholar to uncover the broadest depiction of Weiss's influence. Fortunately, Scopus catalogs and links all citations appearing in its indexed catalog. Scopus terms the citations linking to documents that are not available directly in their database as secondary documents (Elsevier, 2020b). Most of Weiss's publications (n=116, 67.44%) appear as secondary documents in the Scopus database, including nearly all her books.

All queries of Scopus used the web interface provided by Western Michigan University. First, I performed an author search to identify the profile for Carol Hirschon Weiss (Author ID: 7202167020) and the 48 documents[4] directly indexed in Scopus's database. For the 48 directly indexed documents, Scopus provides a complete list of citations and accounting of how many documents appear in each of Scopus's 28 subject categories. Scopus permits up to nine subject

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[3] See supplementary material in Martín-Martín et al. (2018) for an extensive discussion of the strengths and weaknesses of Google Scholar

[4] Two of the citations are duplicates. *Evaluation Practice* is a precursor journal to *American Journal of Evaluation*. Many articles published in *Evaluation Practice* are indexed again as being published in *American Journal of Evaluation*, including two articles by Weiss, "Politics and evaluation: A reprise with mellower overtones" (1993a) and "Where politics and evaluation research meet" (1993b). Citations to duplicates were combined.

Table 11

Extent of Publication Coverage of Google Scholar, Scopus, and Web of Science Core Collection

	Google Scholar (*Google Scholar search tips*, 2020)	Scopus (Elsevier, 2020a)	Web of Science Core Collection (Web of Science Group, 2020)
Producer/Developer	Google	Elsevier	Clarivate Analytics
Number of journals	Unknown; individual papers are indexed rather than journals.	39,743 + (1970 – present)	21,294 + (Sciences & Social sciences: 1900 – present; Arts & Humanities: 1975 – present, though substantial gaps prior to 1950 exist)
Conference proceedings	Unknown	9.8 million + (primarily 1996 – present)	8 million + (1990 – present)
Books	Unknown	210,000 + (almost exclusively book series going back to the 1900s)	111,000 + (2005 – present)
Non-English material	Substantial coverage, but unknown extent	Approximately 22% of entire database is non-English	n/a
Estimated coverage (Gusenbauer, 2019)	>389 million	>72 million	>105 million

categories for each document. I downloaded the full list of citations into individual spreadsheets. For the subject categories, I created a separate Excel workbook with each of Weiss's publications as rows and the subject categories as columns. The associated data was copied by hand from Scopus into the Excel workbook. Scopus lacks a method of downloading the subject category information directly for each document.

Collecting data from and relating to Weiss's "secondary documents" followed the following procedure. First, I searched Google Scholar using Publish or Perish (Harzing, 2020) software for one of Weiss's publications not directly indexed in Scopus. I then searched for all publications citing the particular Weiss publication. Next, I identified a document directly indexed in Scopus that cited the Weiss publication through trial and error searching. After identifying a suitable document, I followed the link in Scopus to the Weiss publication. From that point on, the data collection process was identical to indexed documents.

Analysis

The present study examines multiple questions about Weiss's scholarship. Until now, this chapter focused on the methods used in gathering the data to answer the research questions. The catalogs of Weiss's published and unpublished scholarship were used to answer research questions related to the size of Weiss's scholarship. The scope was determined by identifying the domain of each publication. Possible categorizations of Weiss's work and the alignment and interaction of categories were addressed by developing three typologies: type, focus, and domain. Typologies offer both analytic benefits and conceptual clarity not available through purely inductive or deductive reasoning (Collier et al., 2012; Hatch, 2002). As a method of analysis, typologies are fluid and highly responsive to the intent of the study (Klein, 2017). Procedurally, developing a grounded typology (Kluge, 2000) mirrors developing codes for the

"domain of document" and were used interchangeably for the analysis. The systematic map provides a visualization of how the various categories in the grounded typology interact.

Citation data were used in raw form to identify the presence of influence in a discipline. The use of raw citation counts as an auditable form of influence aligns with the sociological theory of citation (Moed, 2005). For this study, it was sufficient to describe the presence of a citation in a particular field. Because the volume of citations in a field is irrelevant, citation count manipulation and standardization, such as harmonic allocation of authorship credit, was unnecessary. Citation counts were collected for each of Weiss's documents and, by extension, for each of the qualities of Weiss's documents (e.g., type, focus, domain). Lastly, I intentionally allocated space for identifying any other patterns discovered in the citation data.

Trustworthiness

Trustworthiness in qualitative studies often addresses four topics: reflexivity, credibility, transferability, and dependability (Cresswell & Poth, 2018; Lincoln & Guba, 1985). Attending to these four areas requires a researcher to check personal biases and subjectivity during the research regularly. Reflexivity is part of the regular and intentional understanding a researcher has to the phenomenon studied and the data sources used in the study. I began this chapter by addressing my role as the researcher and the biases I had at the outset of the study. Throughout the description of the process, I was intentionally transparent with the choices I made that influenced the data collection and analysis. Initially, this study of Weiss's scholarship included multiple statistical analyses of citation data. After starting to figure out the best way to analyze the citation data, the myriad issues with citation analysis began to erode my original intent of understanding Weiss's influence in a quantitative way. Shifting to a predominantly qualitative

study reflects how my interaction with the data changed my research approach, and ultimately the analysis and results of the present study.

Data comes from two sources, respected databases, including university libraries and publishing companies, and myself, the researcher. The credibility of the data gathered from Scopus, Web of Science, and Google Scholar are commonly accepted. The credibility of the data I created increased through a high level of familiarity with the documents studied and checks of intrarater reliability. Having at least three reviews of each document increased my familiarity with the content and allowed for a more thorough analysis. Reliability was bolstered by the presence of multiple printings of some documents and the associated near-perfect agreement (see Appendix D). Dependability was addressed by the high level of internal agreement related to the coding process.

Because the entire population of Weiss's scholarship was reviewed, the direct transferability of these findings to other scholars' work may be weak. Transferability is not the goal of this study, however. The study does act as a demonstration of whether the processes and methodology are transferable to other scholars' bodies of work. The types and foci of publications are common throughout much academic writing, regardless of discipline or author. The domain of the document is grounded in the language Weiss used in discussing concepts, observations, and research on various topics. While the specific major and minor codes are unlikely to be transferable due to linguistic variation and disciplinary preferences, the iterative process leading to the development of the codes is transferable.

Limitations

Primarily the study is limited by having only one coder. By having only one coder, all my biases are present in the study. The reflective and iterative coding process can mitigate some of

these biases. However, any unknown or unexamined biases I have are possibly still present throughout the study. Additionally, some documents had been read before beginning the present study while others had not. The degree to which some documents were reviewed before this study also varies. Indeed, prior notions from discussions with professors, colleagues, and students played a role in my interpretation of these documents. The usual limitations of bibliometric data and the databases themselves apply to this study regarding the citation data. These limitations are discussed at length in chapter 2 and earlier in the current chapter.

Summary

The study began with the hope of including all Weiss's publicly available scholarly work in the analysis. In one sense, the study included published and unpublished material in the catalogs of Weiss's work. Yet, the cataloging process showed that unpublished work comprises mostly drafts of published work. Only one unpublished document was discovered, which could be an evaluation report and might not "publicly available." Only publications were included in the following analyses.

Though Petersen and colleagues' (2015) systematic mapping process was used as a guide, I needed to adapt the framework to be appropriate to the study of one scholar rather than one field. Research questions are ubiquitous in most research and are present in both applications. The broad search for documents relevant to this study required a list of permutations of Weiss's name tailored to each database's search parameters rather than a codebook of keywords aimed at scoping. The data used to develop the catalogs of Weiss's scholarship were collected from library catalogs and original documents, not research databases. Inclusion and exclusion criteria were based on whether citation data was available and whether documents were drafts or final products, rather than availability, language, and study type. However, inclusion and exclusion

can be based on any criterion, making the selection of inclusion and exclusion criteria idiosyncratic. Developing a grounded typology (Kluge, 2000) from Weiss's publications addressed the classification point of the framework. Sufficient exposure to the data occurred by having at least three reviews of each document allowed. Data were extracted from the original documents for the qualities studied, and Google Scholar and Scopus provided citation data. Similar to Petersen and colleagues' (2015) study, the analysis included counting each document in each identified code. Additional analyses examined the interaction and overlap of the grounded typology codes/categories and the timeline of publications by category and volume of citations of publications Weiss authored. Finally, various checks on validity and accuracy occurred. The next chapter presents the results of the aforementioned analyses.

CHAPTER IV

FINDINGS

This chapter describes findings from the research processes described in chapter 3. The organization of the chapter follows that of the research questions, which were:

1) What is the size and scope of Carol Hirschon Weiss's scholarship?

   a. What are the published and unpublished works?

   b. What empirically grounded categories or types appropriately describe domains/themes in Weiss's scholarship?

   c. How do these categories interact (e.g., align, intersect) with one another?

2) Which disciplines cite which individual works?

   a. To what extent is Weiss's work cited in various disciplines?

   b. To what extent are Weiss's publications that focus on methodology, theory, and research results dissemination cited in various disciplines?

   a. What other patterns or trends are observable in the citations?

The chapter begins with describing the size and scope of Weiss's scholarship by presenting counts of her unpublished and published works. I then present two empirically grounded typologies of Weiss's publications. These typologies derive from the theoretical codes of documents' domain, type, and focus. I also share the subject categorizations of Weiss's work derived from Ulrichsweb subject categories and Library of Congress Subject Headings (LCSH). Next, I present two maps of how the domain categories might align, intersect, or overlap.

In the second section of the chapter, I describe the breadth of Weiss's influence using data from Scopus. This discussion focuses on identifying any patterns between the focus of the document and citations appearing in publications in Scopus. Other patterns and trends observed

in the citation data follow. Fundamentally, the first discussion examines Weiss's work itself, and the second discussion explores the influence of Weiss's work.

Size and Scope of Weiss's Scholarship

Creating catalogs of Weiss's unpublished and published scholarly work was the first step in determining the size and scope of Weiss's academic output. These catalogs appear respectively as Appendix A and Appendix B of this dissertation. Weiss's published works are indexed in multiple locations. Searches of four university library system[5] databases resulted in 3,257 records attributed to Weiss. Lists from each library were combined and checked by hand for records not authored by Carol Hirschon Weiss or records pointing to the same document (duplicate entries). An entry was considered a duplicate if the publication information, such as publisher, location, page numbers, volume, issue, and others, was identical for two entries. The final list of documents was compared to the list of published documents in Weiss's archive. Publications identified in Weiss's archive that did not appear in the library searches were added. Primarily, these additions were reprintings of indexed work.

Published and Unpublished Work

A total of 250 documents appear in the two catalogs of Weiss's scholarly output. Figure 1 presents a map of Weiss's entire body of work, organized by whether a document was published or not and the type of document. Unpublished documents account for approximately 10% of Weiss's entire body of work. Of the 26 unpublished documents, only two documents are not draft versions of later publications. One document is an unpublished conference paper, "Translation of Social Science Research into Public Knowledge" (Weiss, 1984), which influenced the published article "Media Report Card for Social Science" (Weiss, 1985) but falls short of being a draft

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[5] The library databases at Columbia University, Harvard University, The University of Melbourne, and Western Michigan University were queried.

version. To be considered a draft, a document must contain either substantial sections of identical language or an identical format. The conference paper lacked both these qualities. The other document is a manuscript titled "The Policy-Making Process in a State Board" (Weiss, 2000), which is clearly labeled "DRAFT" and does not appear to be directly related to any published material. As mentioned in chapter 3, Weiss's unpublished work was meant to be included in the analyses. However, the available unpublished works were determined to be almost exclusively earlier drafts of published work. Though these writings may provide a prime source for other analyses (such as a study examining rhetoric or Weiss's writing process), they were not appropriate to the present study of influence. The remaining analyses in this chapter refer only to published documents.
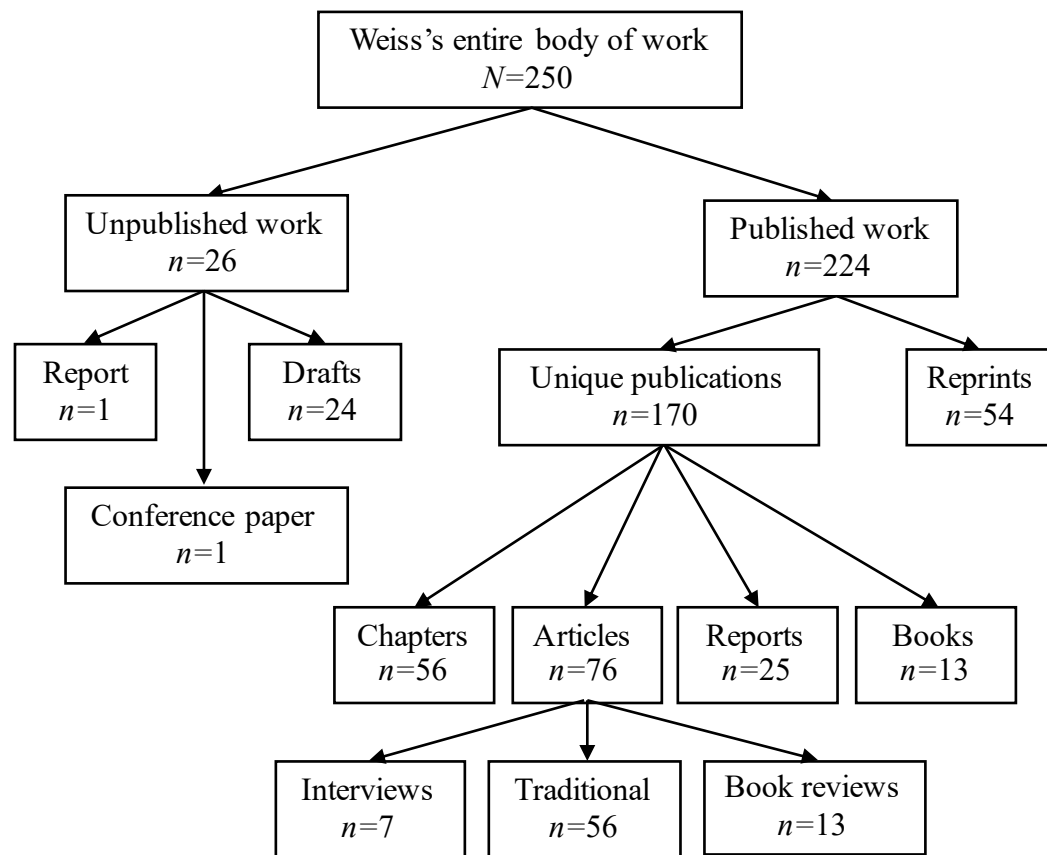
Figure 1. Map of Weiss's Scholarly Output by Type of Document

Grounded Typologies

Three aspects of Weiss's scholarship were recorded while gathering and cataloging Weiss's scholarship. The aspects were explained in detail in "Categorizing Carol Hirschon Weiss's Body of Work" in chapter 3. As a brief reminder, the aspects were: type (e.g., book, chapter, journal article, report), focus (i.e., whether a document primarily addresses theory, methods, research results, or a combination of these) and domain (i.e., the subject matter at hand in a document). I discuss the three aspects in turn in the following sections.

Type of Document

Of Weiss's 224 published works, nearly one quarter (n=54, 24.10%) are reprintings of earlier publications. Table 12 displays the total number of documents by "type of document," including the number of reprints. Twenty-seven unique publications were reprinted 78 times as of July 2020. Book chapters (n=45) account for more than 80% of Weiss's reprinted publications. Eight of Weiss's reprinted publications (15%) were articles. The remaining reprinting is the book, *Debates on Evaluation* (Alkin, 1990). The book is an edited reprinting of the Center for the Study of Evaluation's report, *Conversations on Evaluation Utilization* (Alkin et al., 1988). The reprinted book consists entirely of previously published work: one dialogue and four journal articles, two by Weiss and two by Michael Quinn Patton.

Table 12

Weiss's Publications by Type of Document

Type of document	Documents	Reprintings	Unique works
Article	64	8	56
Article – book review	13	0	13
Article – interview	7	0	7
Book	14	1	13
Chapter	101	45	56
Report	25	0	25
Total	224	54	170

Most reprintings were book chapters in edited volumes that originally appeared as articles (*n*=32, 59.26%) or book chapters (*n*=6, 11.11%). Five of Weiss's reports were reprinted in various formats, including articles (*n*=6, 11.11%), chapters (*n*=5, 9.25%), and one book (1.85%). Portions of Weiss's *Evaluation Research: Methods for Studying Programs and Policies* (1972a) were reprinted twice as book chapters (3.7%) and once as an article (1.85%). One article was reprinted as an article (1.85%) under a different title. Table 13 presents a full accounting of Weiss's reprinted works. Reports were not reprintings of earlier material, and no book reviews or interviews were reprinted in any form. Older publications tended to be reprinted more times than newer publications.

Weiss's most reprinted work is the article, "Where Politics and Evaluation Research Meet" (Weiss, 1973d). The work appears under the same title in three books (Weiss, 1975c, 1979c, 1987a), one government manual (Weiss, 1976c), and once as an article again (Weiss, 1993c) twenty years later. The original article was also published three times as a book chapter under the title, "Evaluation Research in the Political Context" (Weiss, 1975a, 1976a, 1979b). The second title was used in a related book chapter with the subtitle, "Sixteen Years and Four Administrations Later" (Weiss, 1991a). Except for the 1991 related publication, all the printings have identical text. The first few paragraphs of the article are also reprinted in the first seven editions of the popular textbook, *Evaluation*: *A Systematic Approach,* by Peter H. Rossi and various colleagues between 1979 and 2004. Another publication by Weiss and coauthored by Michael Bucuvalas, "Truth tests and utility tests: Decision-makers' frames of reference for social science research," also appears in edited and excerpted form in the first seven editions of *Evaluation*: *A Systematic Approach*. To be clear, the repeated publication of many of Weiss's

Table 13

Reprintings of Weiss's Publications

Doc.	Title	Printings
6	Utilization of evaluation: Toward comparative study.	(Weiss, 1967a, 1971, 1972a, 1972c)
16	The politicization of evaluation research.	(Weiss, 1970, 1972b, 1975b, 1976b)
20	*Organizational Constraints on Evaluation Research* (Between the cup and the lip.	(Weiss, 1971a, 1973b, 1974c, 1977a)
26	*Evaluation research: Methods for assessing program effectiveness.*	(Weiss, 1972a, 1977b, 1992b, 1996)
29	Alternative models of program evaluation.	(Weiss, 1974a, 1974b)
32	Where politics and evaluation research meet / Evaluation research in the political context.	(Weiss, 1973d, 1975c, 1975a, 1976a, 1976c, 1979c, 1979b, 1987a, 1993c)
44	Research for policy's sake: The enlightenment function of social research.	(Weiss, 1977c, 1978, 1999)
45	Truth tests and utility tests: Decision-makers frames of reference for social science research.	(Weiss & Bucuvalas, 1977, 1980, 1981)
56	Bibliography on research utilization.	(Weiss, 1979a, 1983)
59	The many meanings of research utilization.	(Weiss, 1979d, 1985b, 1986, 1991b)
64	Knowledge creep and decision accretion.	(Weiss, 1980a, 1991c)
66	Measuring the use of evaluation.	(Weiss, 1981, 1982a)
67	Policy research in the context of diffuse decision making.	(Weiss, 1982b, 1982c, 1982d, 1982e)

Full citations are found under References and in Appendix B where the reprintings are nested under the original printing.

Table 13 – continued

Doc.	Title	Printings
68	Social scientists and decision makers look at the usefulness of mental health research.	(J. A. Weiss & C. H. Weiss, 1981, 1996)
76	The stakeholder approach to evaluation: Origins and promise.	(Weiss, 1983b, 1984a, 1986b)
77	Toward the future of stakeholder approaches in evaluation.	(Weiss, 1983c, 1984b, 1986c)
78	Ideology, interests, and information: The basis of policy positions.	(Weiss, 1983b, 2000a)
91	*Conversations on evaluation utilization.*	(Alkin et al., 1988, 1990)
92	Evaluation for decisions: Is anybody there? Does anybody care?	(Weiss, 1988a, 1990a, 2005)
93	If program decision hinged only on information: A response to Patton.	(Weiss, 1988b, 1990b)
100	*Re-thinking school leadership: An agenda for research and reform.*	(Bolman et al., 1990, 1991)
105	*Trouble in paradise: Teacher conflicts in shared decision making.*	(Weiss et al., 1991, 1992)
114	Helping government think: Functions and consequences of policy analysis organizations.	(Weiss, 1992a, 1999a)
115	*Shared decision making about what? A comparison of schools with and without teacher participation.*	(Weiss, 1992d, 1993c)
123	*Principals' role in shared decision making: Managing skepticism and frustration*	(Weiss & Cambone, 1993b, 1994)
138	Have we learned anything new about the use of evaluation?	(Weiss, 1998b, 2005b)
155	Rooting for evaluation: A cliff notes version of my work.	(Weiss, 2004, 2012a)

Full citations are found under References and in Appendix B where the reprintings are nested under the original printing.

work was not an attempt on her part to appear to be more productive nor was it outside the bounds of ethics and integrity. Weiss's work appears as reprintings because it is unique, influential, and groundbreaking. Each reprinting was identified as a previously published work with appropriate permissions from the original publisher. In the case of "Where Politics and Evaluation Research Meet," the original printing was in a now defunct journal with a short publication history. Reprinting the article in anthologies and eventually in a digitized form allow the publication to remain an active part of academic discourse.

Removing reprintings and unpublished works brings the number of unique, published works Weiss authored or coauthored to 170. Approximately one-third (n=56, 32.94%) of Weiss's publications are traditional journal articles, with an additional 7.64% (n=13) being book reviews and 4.12% (n=7) being interviews published in journals. Combined, publications in journals account for almost half of Weiss's unique documents (n=76, 44.70%). Nearly one-third of Weiss's unique publications are book chapters (n=56, 32.94%). Weiss's books account for 7.64% (n=13) of her publications, while evaluation reports account for nearly 14.12% (n=25).

Focus of Document

Table 14 presents counts of publications organized by the "type of document" and the "focus of document." More than half of Weiss's published works focus on theory alone (n= 87, 51.48%). An additional 2.37% (n=4) focus on both theory and methods. Publications that focused on methods alone account for nearly one-eighth of Weiss's scholarly output (n=21, 12.43%). Reviews of others' work and reflections on her own work amount to almost one-fifth (n=31, 18.34%) of Weiss's publications. The presentation of findings from research, without the primary purpose of developing theories or discussing methodological issues, accounts for approximately one-seventh of Weiss's publications (n=26, 15.38%).

Table 14

Weiss's Publications by Type of Document and Focus of Document

Type of document	Methods	Research	Review	Theory	Theory & methods	Total
Article	6	11	4	35	-	56
Article – book review	-	-	13	-	-	13
Article - interview	-	-	7	-	-	7
Book	2	2	-	5	4	13
Chapter	5	3	6	42	-	56
Report	8	10	2	5	-	25
Total	21	26	32	87	4	170

Research is presented more often through journal articles (n=11, 42.31%) and evaluation reports (n=10, 38.46%) than in other types of documents. Theory is found most often in book chapters (n=42, 48.28%) and traditional articles (n=35, 40.23%). Book reviews and interviews are reviews by definition and therefore do not appear with any other focus. Most of Weiss's books focus on theory or the combination of theory and methods. Weiss authored many reports addressing research methods early in her career (e.g., Weiss, 1966a, 1966c, 1968; Weiss et al., 1971). Later reports provide the results of research studies (Bolman et al., 1990; Weiss, 1991b, 1992d; Weiss & Cambone, 1993a).

Domain of Document

Fourteen codes emerged during theoretical coding for the "domain of document." The codes comprise the categories in the grounded typology of Weiss's publications. The fourteen categories were grouped into four categories: evaluation, knowledge utilization, methodology, and reflections. The first two categories, evaluation and knowledge utilization, correspond to the two topics Carol Hirschon Weiss identified as her areas of scholarship (Janet A. Weiss, her daughter and coauthor, personal communication, December 15, 2016). The methodology category follows from Weiss's early publications discussing interview and survey practices and

aligns with her placement on the "methods branch" of the evaluation theory tree (Alkin & Christie, 2004). The reflections category contains interviews with Weiss and reflections she published on her work and others' work. Table 15 presents the number of publications in each "domain of document" category by "focus of document." Approximately half (*n*=87, 51.18%) of Weiss's publications focused on knowledge utilization, while publications focused on evaluation amounted to just under one-third (*n*=53, 31.18%). Twenty-publications (13.5%) focused on methodology, and the remaining seven publications (4.12%) were reflections.

Looking only at the major categories, Weiss's scholarship on evaluation topics most often focused on developing and discussing theory (*n*=40, 75.47%). Weiss's other publications on evaluation topics included reviews (*n*=5, 9.43%), the presentation of research (*n*=2, 3.77%), evaluation methods (*n*=2, 3.77%), and the combination of methods and theory (*n*=4, 7.54%). Approximately half of Weiss's publications on knowledge utilization focused on theory (*n*=47, 54.02%), with slightly more than one-quarter (*n*=23, 26.44%) being the presentation of research results and nearly one-fifth (*n*=17, 19.54%) reviewing other knowledge utilization works.

Examining the same data by focus, Weiss's publications that present research findings overwhelmingly addressed knowledge utilization (*n*=23, 88.46%). More than half of Weiss's publications focused on reviewing others' work were in the field of knowledge utilization (*n*=17, 53.13%). Publications espousing theory were divided almost equally between evaluation (*n*=40, 45.98%) and knowledge utilization (*n*=47, 54.02%). Within the major category of methodology, interviewing was the most frequent topic (*n*=9, 39.13%), followed by surveys (*n*=6, 26.08%). Weiss published two documents focused exclusively on evaluation methodology, and all four documents focusing on both theory and methods were in the general evaluation category. How these categories interact is the subject of the section on systematic maps.

Table 15

Weiss's Publications by Domain of Document and Focus of Document

Topic of document	Category	Methods	Research	Review	Theory	Theory & Methods	Total
Evaluation	General	1	-	4	14	4	23
	Politics and politicization of	-	-	-	8	-	8
	Stakeholder approach	-	-	-	2	-	2
	Theory-based evaluation	1	1	1	7	-	10
	Use	-	1	-	9	-	10
Knowledge utilization	Decision-making	-	8	3	9	-	20
	Evidence-based policy	-	2	-	1	-	3
	Policymaking	-	7	9	32	-	48
	Research utilization	-	2	4	5	-	11
	Social sciences & the media	-	4	1	-	-	5
Method-ology	Interviewing	8	-	1	-	-	9
	Methodological issues	5	1	2	-	-	8
	Surveys	6	-	-	-	-	6
	Reflections	-	-	7	-	-	7
	Total	21	26	32	87	4	170

Disciplines of Weiss's Publications

Categorizing Weiss's publications into subject categories proved somewhat complicated. Weiss published her scholarship as books and book chapters (n=69, 40.59%), journal articles (n=76, 44.71%), and reports (n=25, 14.71%). No indexing organization indexes all of Weiss's publications. To overcome the issue, I combined subject categorizations from three sources: Library of Congress, Ulrichsweb, and university library systems. Library of Congress Subject Headings (LCSH) could be found for most books published in the United States, but not all. Books published outside the United States were not always cataloged. For periodicals, Ulrichsweb indexes nearly all serial publications globally. Ulrichsweb subject categories were based on LCSH originally, allowing for a somewhat seamless comingling of the subject categories and subject headings. Fortunately, Harvard University cataloged many of Weiss's reports. For documents that did not have a subject category identified in one of the three systems, I used my judgment to assign a subject category.

Assigning subject categories is not an exact science, and two libraries may catalog the same publication differently. Table 16 displays the varying subject categories listed for the second edition of Weiss's (1998) textbook, *Evaluation: Methods for Studying Programs and Policies*, at the Library of Congress, and the four university libraries mentioned earlier.

Table 16

Subject Categories Used for Weiss's "Evaluation" *(1998)*

	Library of Congress	Columbia University	Harvard University	The University of Melbourne	Western Michigan University
Evaluation research (Social science action programs)	X	X	X	X	X
Evaluation			X		X
Social action			X		X
Social sciences – Research			X		X
Social service – Research			X		X
Weiss, Carol H.				X	
Weiss, Carol H. Evaluation research	X	X			
Social Sciences (Med. subject)			X		
Evaluation Studies as a Topic (Med. subject)			X		

As shown in Table 16, one document can be assigned to more than one subject category. Some

books and many periodicals that published Weiss's scholarship appear in more than one subject.

American Journal of Evaluation appears with both "business and economics – management" and

"social sciences: comprehensive works" subject categories in Ulrichsweb. Weiss's edited book,

Organizations for Policy Analysis: Helping Government Think (1992), appears with four LCSH:

Government consultants—United States; Policy sciences; Research institutes – United States;

Group problem solving – United States. All four LCSH for this text were combined into the

Ulrichsweb category "public administration." Nineteen major subject categories have been

associated with Weiss's publications, as shown in Table 17.

Table 17

Major Ulrichsweb Categories Associated with Weiss's Publications

Subject Category	Number of documents
Business & economics	22
Children & youth	1
Communications	3
Criminology & law enforcement	1
Drug abuse & alcoholism	1
Education	31
Housing & urban development	4
Occupations and careers	4
Philosophy	1
Political science	19
Psychology	11
Public administration	48
Public health & safety	1
Science: Comprehensive works	5
Social sciences	6
Social sciences: Comprehensive works	104
Social services & welfare	18
Sociology	18
Statistics	1
Women's studies	1
Total	300

More than one-third (*n*=104, 34.67%) of Weiss's publications appear under the broad category: "Social sciences: Comprehensive works." The next four subject categories Weiss's work appeared in were "Public administration" (*n*=48, 16%), "Education" (*n*=31, 10.34%), "Business and economics" (*n*=22, 7.34%), "Political science" (*n*=19, 6.34%), and a tie between "Social services & welfare" and "Sociology" (*n*=18, 6%).

Systematic Maps of Weiss's Publications

     Displaying data for the domain and focus categories in a table belies the logical closeness between minor codes/categories. The systematic map presented in Figure 2 shows the total number of publications in each category and the categories' conceptual proximity.
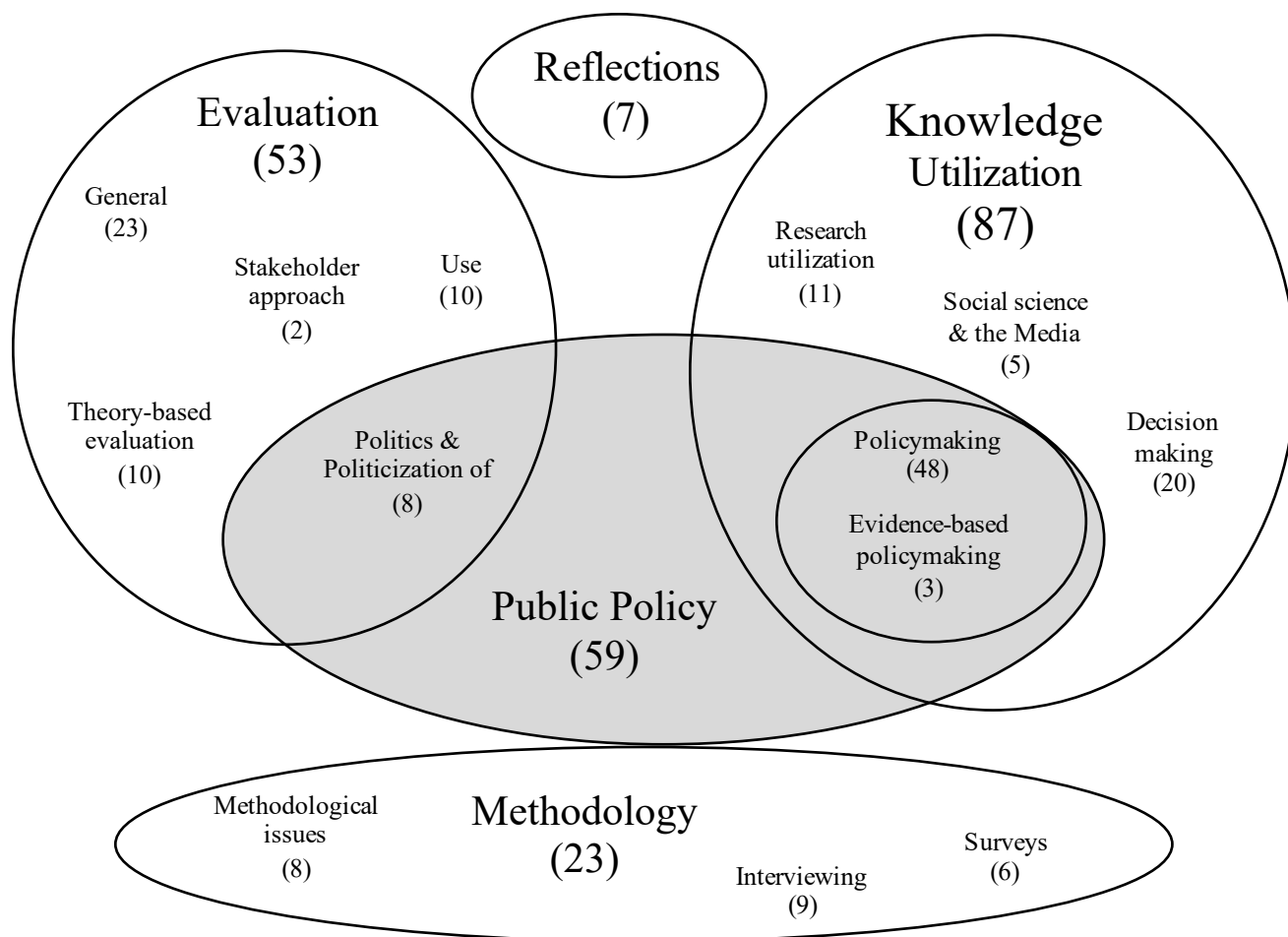
Figure 2. Systematic Map of the Domain of Document with Public Policy Overlay

     Three minor categories account for more than half of Weiss's unique publications: "policymaking," "evaluation – general," and "decision-making." The minor category with the most publications associated was "knowledge utilization – policymaking" (*n*=48). "Evaluation – general" was the next largest category with 23 documents, approximately half as many

publications as "knowledge utilization – policymaking. "Knowledge utilization – decision-

making" had 20 associated publications. Weiss's discussions of policymaking inevitably include

mentions of whether and how knowledge is (or is not) used. Similarly, Weiss's discussions of the

political nature of evaluation tend to explore using evaluation as a political tool in the policy

process. Overlaying a "public policy" category allows visualization of Weiss's public policy

context without losing Weiss's understanding of her work.

However, considering just the minor categories developed during theoretical coding led

to a different map. Creating the second map (Figure 3) involved developing groupings based on

categories, rather than relying on interpretations of Weiss's work developed before undertaking

the present study. Separate groupings for methods and reflections were present in both systematic

maps. These two categories combined account for 17.65% of Weiss's scholarly output. The

groupings around methodology include nearly all Weiss's publications discussing gathering data

using appropriate and contextually sensitive methods. Therefore, including Weiss's concern with

providing a voice to marginalized groups through evaluation in the systematic maps.

The most apparent difference between the two maps is the reorganization of more than

80% of Weiss's publications. Rather than capturing the public policy context of Weiss's work

with an overlay, the second map separated "politics and policy," from "use," and "evaluation

theory." These categories align closely with categorizations offered by Mathison (2005) and

Newcomer (2015).
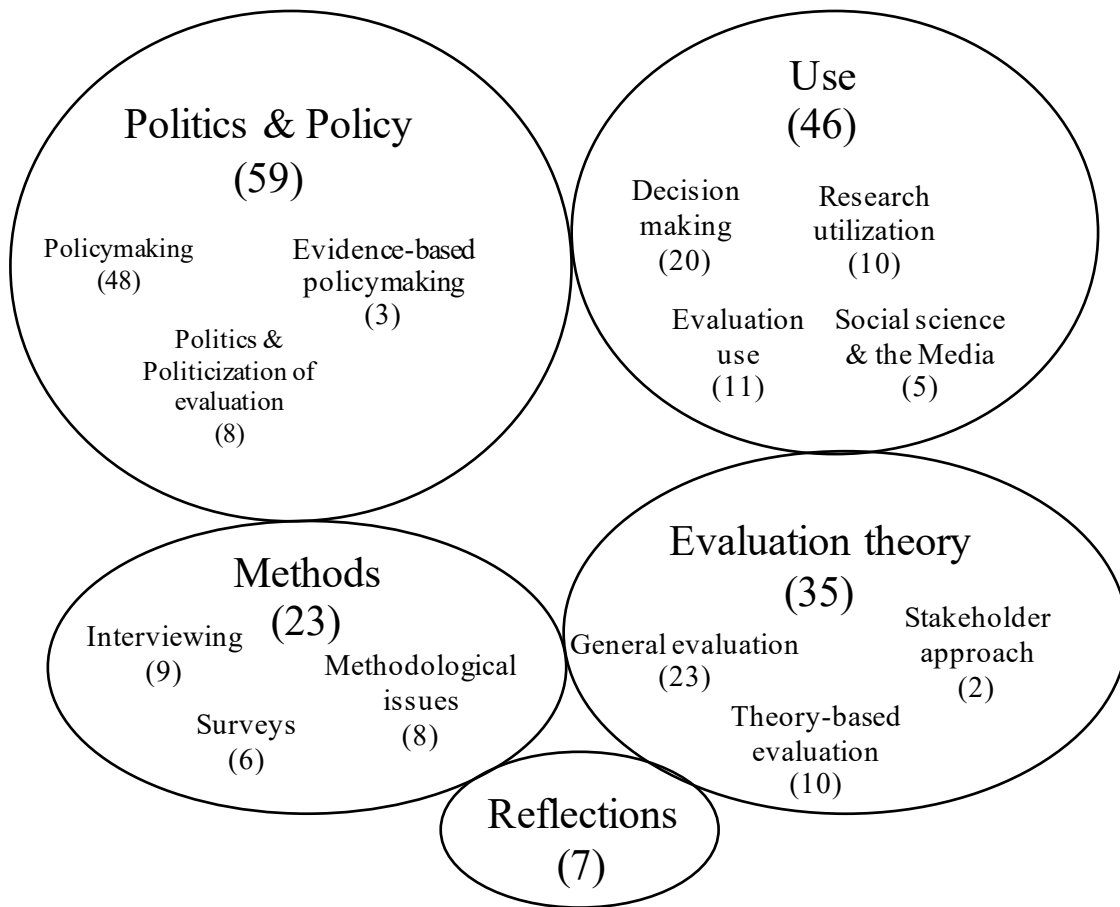
Figure 3. Systematic Map of the Domain of Document Grouped by Minor Category

Subject Categories and Disciplines

This study set out to identify if relationships exist between the focus of Weiss's publications and citation behavior in various disciplines and the extent of such relationships. The caveats and limitations of determining disciplines of Weiss's publications apply to gathering and analyzing documents citing Weiss's publications. As discussed in chapter 3, the present study examined citation data from Scopus alone because recent research suggests that Scopus is a generally representative subset larger datasets (Martín-Martín et al., 2018). Before discussing the presence of any relationships, I examine the comparability of the data available from Scopus with three sets of Weiss's publications.

Comparison of Scopus to Weiss's Publications

Weiss wrote and published 224 documents, including 170 unique publications. Table 18 summarizes the type, focus, and domain of Weiss's publications in Scopus alongside just the traditional articles and all unique publications.

Table 18

Comparison of Weiss's Publications and Data Available from Scopus

	Category	Unique publications		Weiss publications	
		Scopus (*n*=113)	Weiss (*n*=170)	Scopus (*n*=139)	Weiss (*n*=224)
Type of document	Article	53	56	58	64
	Article - book review	0	13	0	13
	Article - interview	5	7	5	7
	Book	11	13	11	14
	Chapter	38	56	61	101
	Report	6	25	6	25
Focus of document	Methods	12	21	12	21
	Research	18	26	22	33
	Review	13	32	14	35
	Theory	66	87	89	130
	Theory & methods	4	4	4	5
Domain of document — **Evaluation**	General	14	23	18	31
	Politics and politicization of	5	8	9	20
	Stakeholder approach	2	2	5	6
	Theory-based evaluation	9	10	9	10
	Use	7	10	13	19
Knowledge utilization	Decision-making	15	20	20	30
	Evidence-based policy	3	3	3	3
	Policymaking	33	48	35	54
	Research utilization	7	11	10	15
	Social sciences & the media	5	5	5	5
Methodology	Interviewing	7	9	7	9
	Methodological issues	1	8	1	8
	Surveys	2	6	2	6
	Reflections	3	7	4	8

Scopus indexes a portion of available periodicals, book series, and books.[6] The following

analyses only include data from publications indexed in Scopus as of August 14, 2020. Scopus

does not index book reviews, but all other document types are present in the citation data. Thirty-

nine of Weiss's journal articles were directly indexed in Scopus or 17.41% of Weiss's scholarly

work. None of Weiss's books, reports, book reviews, interviews, or book chapters were directly

indexed. Relying solely on directly indexed articles would have a limited interpretation of the

analysis. However, nearly all of Weiss's journal articles (90.63%) and books (78.57%) appeared

in Scopus as either directly indexed or secondary documents. Overall, more than two-thirds

(n=113, 66.47%) of Weiss's unique publications and over three-fifths (n=141, 62.94%) of

Weiss's total publications appear in Scopus.

Citations and Subject Categories of Publications Citing Weiss

The 141 publications appearing in Scopus that Weiss authored were cited 10,087 times

between their publication and August 14, 2020. Scopus assigns publications in its catalog to at

least one subject category. The average number of categories assigned to a publication was 1.54

using Scopus's June 2020 catalog, the most recent. In the same catalog, the highest number of

subject attributions was nine. The presence of a publication in more than one subject category

broadly reflects the publication's actual and intended content. If a document Weiss authored was

cited in a journal with more than one category, all categories were included. Therefore, the

10,087 citations of Weiss's publications were attributed to 16,454 subject categories.

Checking for documents citing the same work was necessary considering the sizeable

proportion (24.11%) of Weiss's reprinted unique scholarship. Twenty-two articles (44 citations)

appeared as duplicates in the raw data and were removed before any analysis. The underlying

---

[6] The full listing of Scopus's indexed publications is available at:
https://www.elsevier.com/solutions/scopus/how-scopus-works/content

reason for this duplication is unknown. Surprisingly, five articles (ten citations) cited the same work by Weiss twice in the same document. Two articles cited both the 1979 and 1986 printings of "Many Meanings of Research Utilization," and three articles cited different printings of "Where Politics and Evaluation Research Meet," which was also printed as "Evaluation Research in the Political Context."

Table 19 displays the total number of documents in each "focus of document" category, the raw number of citations appearing in Scopus, the total number of category attributions, and the number of attributions in each of the 28 Scopus subject categories. The first task in determining if there is a relationship between subject area attribution and the "focus of document" was performing a chi-square test for independence (Sullivan III, 2017). The chi-square test for independence has two requirements:

1. All expected frequencies are greater than or equal to 1.

2. No more than 20% of the expected frequencies are less than 5.

Only the first twelve subject categories presented in Table 19 met both conditions. The subject attributions in these twelve categories account for nearly all (n=16,023, 97.4%) the citation data. "Environmental studies" was the sole subject category that exhibited a statistical association between "focus of the document" and citation behavior. The relationship between these variables was very significant χ^2(44, N=16,023) = 91.764, p < .001). The chi-square test of independence showed no significant association for all other subject categories. Therefore, we have insufficient evidence from this data that the "focus of the document" plays a role in citation practices.

To determine whether a statistical association existed between the "domain of document" categories and subject categories proceeded along two paths—one path for each systematic map developed earlier in this study. No further analysis would be possible using only minor subject

Table 19

Scopus Subject Categories Attributed to Publications Citing Weiss

	Method	Research	Review	Theory	Theory and Method	Total
Number of documents cited	12	22	14	89	4	141
Number of citations	694	1,017	49	6,391	1,936	10,087
Number of subject categories	1,124	1,590	87	10,319	3,334	16,454
Social Sciences	471	788	43	4,815	1,368	7,485
Medicine	189	223	6	1,249	499	2,166
Business, Management, and Accounting	99	149	17	1,147	399	1,811
Psychology	119	183	9	831	349	1,491
Environmental Science	37	33	1	658	111	840
Arts and Humanities	54	104	1	444	129	732
Economics, Econometrics and Finance	30	22	3	228	66	349
Decision Sciences	19	18	4	186	96	323
Nursing	21	13	0	155	77	266
Engineering	10	10	1	123	65	209
Computer Science	10	5	0	111	57	183
Agricultural and Biological Sciences	14	9	0	114	31	168
Health Professions	10	6	0	40	22	78
Earth and Planetary Sciences	3	5	0	54	11	73
Mathematics	17	6	1	33	12	69
Biochemistry, Genetics and Molecular Biology	9	4	0	35	4	52
Energy	1	2	0	34	11	48
Multidisciplinary	4	1	0	15	1	21
Neuroscience	1	6	0	9	5	21
Pharmacology, Toxicology, and Pharmaceutics	4	2	0	4	3	13
Materials Science	0	0	0	8	3	11
Chemical Engineering	0	0	0	8	2	10
Dentistry	1	0	0	3	4	8
Immunology and Microbiology	0	0	0	5	3	8
Chemistry	0	1	0	3	2	6
Physics and Astronomy	1	0	0	3	1	5
Undefined	0	0	1	1	2	4
Veterinary	0	0	0	3	1	4

categories because many cells had an expected value of zero. After combining minor categories

under the major categories in Figure 1, both "reflections" and "methodology" failed to meet the

minimum criteria for the chi-square test for independence by having cells with an expected value of zero. The chi-square test of independence showed no significant relationship for all subject categories under the "knowledge utilization" major category and only two significant relationships under "evaluation:" "psychology" ($\chi^2(27, N=16,023) = 56.968, p < .001$), and "business, management, and accounting" ($\chi^2(27, N=16,023) = 39.834, p < .05$). After combining subject category attributions for the minor categories in line with the major subject categories presented in Figure 3, I discovered that no subject category met the minimum criteria for the chi-square test for independence and discontinued running the analysis for the second map. The chi-square test of independence showed no significant relationship for the "type of document." Appendix F presents the test statistics and interpretations for each studied quality.

Relationships between individual publications and the number of subject categories in which the publication is cited exist, though the data did not exhibit qualities identifiable through statistical significance testing. Using the presence of a citation in a document attributed to a Scopus subject category as an indicator, it became clear that Weiss's influence could be understood as a function of the "domain of document." Table 20 displays each of Weiss's 13 publications that appear in more than two-thirds of Scopus subject categories. Citations to these publications account for nearly two-thirds (61.18%, $n=6,171$) of Weiss's total citations. Combined, citations to the two editions of Weiss's textbook on evaluation appeared in all 28 categories and amount to almost one-sixth (15.8%, $n=1,593$) of all citations to Weiss's scholarship. Weiss's most cited article, "The Many Meanings of Research Utilization," was also the most broadly cited, appearing in 27 of 28 Scopus subject categories. These three documents accounted for more than 27.7% ($n=2,799$) of all citations to Weiss's publications. Citations to the three publications related to theory-based evaluation appearing in Table 20 were present in 25

94

Table 20

Number of Scopus Subject Categories in Which Select Weiss Publications Appear

Doc.	Title	Year	Domain of document	Focus of document	Scopus categories
59	The many meanings of research utilization	1979	Knowledge utilization - research utilization	Theory	27
136	*Evaluation: Methods for studying programs and policies (2nd ed.)*	1998	Evaluation - general	Theory & methods	26
26	*Evaluation research: Methods for assessing program effectiveness.*	1972	Evaluation - general	Theory & methods	25
129	Nothing as practical as good theory: Exploring theory-based evaluation for comprehensive community initiatives for children and families.	1995	Evaluation - theory-based evaluation	Methods	22
62	*Social science research and decisionmaking.*	1980	Knowledge utilization – decision-making	Theory	20
44	Research for policy's sake: The enlightenment function of social research.	1977	Knowledge utilization - policy making	Theory	19
47	*Using social research in public policy making.*	1977	Knowledge utilization - policy making	Theory	19
135	How can theory-based evaluation make greater headway?	1997	Evaluation - theory-based evaluation	Theory	19
131	Theory-based evaluation: Past, present, and future.	1997	Evaluation - theory-based evaluation	Theory	19
64	Knowledge creep and decision accretion.	1980	Knowledge utilization – decision-making	Theory	18
138	Have we learned anything new about the use of evaluation?	1998	Evaluation - use	Theory	18
127	*New approaches to evaluating community initiatives: Concepts, methods, and contexts.*	1995	Evaluation - general	Theory & methods	18
45	Truth tests and utility tests: Decision-makers' frames of reference for social science research	1980	Knowledge utilization – decision-making	Research	18

Scopus subject categories accounted for more than 10.4% (*n*=1,051) of all citations to Weiss's publications. Citations to Weiss's publications in the domain of "knowledge utilization – decision-making" account for just under ten percent of total citations (9.9%, *n*=1,007). Lastly, Weiss's publications that appeared in the domain "knowledge utilization – policy making" account for nearly eight percent (7.9%, *n*=799) of Weiss's total citations and were cited in 20 Scopus subject categories.

Summary

The current chapter presented the findings of the present study. The study examined aspects of Weiss's publications that are auditable proxies for influence. Two research questions guided the study. The first research question led to the identification of the size and scope of Weiss's available scholarship. Cataloging Weiss's personal archive and searches of four university library collections led to the identification of 250 documents. Of these, 224 (89.6%) were publications. Nearly one quarter (*n*=54) of Weiss's publications are reprintings of earlier works. The present study examined three qualities of Weiss's unique publications (*n*=170): type, focus, and domain. Weiss's publications included journal articles (*n*=76, 44.71%), book chapters (*n*=56, 32.94%), evaluation reports (*n*=25, 14.71%), and both edited and sole-authored books (*n*=13, 7.64%). Weiss's unique publications focused largely on theory (*n*=87, 51.58%). Publications that focus on theory account for more than double the number of publications focusing on reviewing other work (*n*=32, 18.82%), presenting research results (*n*=26, 15.29%), or discussing methods (*n*=21, 12.35%). Four publications combining theory and method account for the remaining 1.96%.

Two maps of Weiss's publications based on the "domain of document" emerged. The first map grouped Weiss's work into methods, reflections, evaluation, and knowledge utilization, with

a contextual overlay of public policy. The second map grouped publications more organically through the minor domain categories. The groupings found in the second map were public policy, use, evaluation theory, methods, and reflections.

The second research question looked at how Weiss's publications have received recognition in the traditional academic disciplines. The analysis used Scopus subject categories as proxies for disciplines, as is common practice in bibliometrics. There are 10,087 citations to Weiss's publications in Scopus as of August 14, 2020. Twelve publications that focus on methodology account for 694 citations. There were 1,017 citations of Weiss's work focusing on the presentation of research results. The fourteen publications that focus on the review of previously published work amount to 49 citations. Ninety publications focus on theory alone and account for 6,394 citations. The remaining 1,936 citations are of works focusing on methods and theory. There are 16,459 category attributions among these 10,087 citations. Citations in publications classified as "social sciences" account for 45.5% of citations (n=7,490). Using the chi-square test of independence on the subject category data showed no statistical relationship between most subjects and the "type of document," "focus of document," or "domain of document" categories. Though statistical approaches did not show a testable relationship between Weiss's publications and citations in Scopus subject categories, qualitative analysis of citations based on "domain of document" illuminated highly influential contributions across Scopus subject categories, specifically "knowledge utilization – research utilization," "evaluation – general," "knowledge utilization – decision-making," and "evaluation – theory-based evaluation."

CHAPTER V

DISCUSSION

The purpose of this study was to understand better the influence of interdisciplinary scholarship in practice, using the work of Carol Hirschon Weiss as an exemplar. After summarizing the research and findings, I examine the interdisciplinary influence of Weiss's scholarship. Then, I describe how the results confirm, refute, or extend existing knowledge about Weiss's scholarly output. Next comes a discussion of the limitations present in the study. A reflexive examination of the research process and recommendations for future studies follow. Finally, I discuss the potential implications of the findings for interdisciplinary research evaluation.

Summary

Research evaluation is the subfield of evaluation that examines the merit, worth, or significance of research. Significance-focused research evaluation tends to follow the sociological theory of citation, which holds that citations are instances of influence. As such, citations are the most readily available and easily auditable form of academic influence, and consequently, the most used and misused indicator of academic influence. Citation data and its various quantitative permutations pose problems for the practice of evaluating interdisciplinary research because bibliometric analyses are intrinsically specific to a single discipline.

The present study examined the influence of the prominent evaluation and knowledge utilization theorist Carol Hirschon Weiss with the hope of identifying aspects of her work that might relate to citation in multiple, diverse disciplines. Rather than following down the well-trod path of quantitative research evaluation, this study consisted of three main efforts organized around two research questions. First, identifying and cataloging Weiss's scholarly output and

developing a grounded typology of Weiss's scholarship addressed determining the size and scope of Weiss's scholarship. Dust jacket mentions, introductions at awards ceremonies, or memorial publications usually contain some statement addressing the size and scope of an author's writings. Accuracy of these claims seldom is questioned, nor need it be. Simply announcing that the author wrote many important works and supplying some examples is sufficient for that purpose. However, the more accurate accounting created as part of this research differs from these other sources. For instance, four sources (Alkin, 2013a; Mathison, 2005; McCartney, 2013; Stame, 2013) identify Weiss as having published only eleven books, but I identified thirteen. The discrepancy may be to my inclusion of *Debates on Evaluation* and her dissertation as books she authored. Another inconsistency appears regarding the number of articles Weiss wrote. The exhaustive identification process yielded "only" 84 articles, while others contend that Weiss published more than 100 (McCartney, 2013). While the exact number is useful to a detailed analysis of her work, echoing Robert Boruch's sentiment that Weiss had an "astonishing (annoyingly high?) productivity" regarding publication is sufficient for general discussion.

Before this study, there were no catalogs of Weiss's unpublished scholarship nor complete bibliographies of her publications. Searches of four library systems and Weiss's personal archive uncovered a total of 250 documents which I organized into separate catalogs for published and unpublished material. There were 26 unpublished documents in Weiss's personal archive, approximately 10% of her entire scholarly output. Of the 26 documents, only two documents were not draft copies of material published later. The second catalog consists of Weiss's published materials and contains 224 entries. Of these, approximately one-quarter (*n*=54) were reprints of earlier publications. Collecting these reprintings illuminated the notable case of one of Weiss's publications, "Where Politics and Evaluation Research Meet," also

published as "Evaluation Research in the Political Context," being reprinted multiple times under two titles as both an article and a book chapter. Nearly two-thirds (n=112, 65.88%) of Weiss's 170 unique publications were either a book chapter or a traditional journal article. Weiss's unique publications included thirteen books, 25 reports, 56 book chapters, and 76 articles (including seven interviews, thirteen book reviews, and 56 journal articles).

The previous paragraphs addressed results from the "type of document" categorization, one of the typologies developed in the present study. The purpose of the grounded typologies was to examine three qualities of Weiss's scholarly output: type (e.g., book, chapter, journal article, report), focus (i.e., whether a document primarily addresses theory, methods, research results, or a combination of these) and domain (i.e., the subject matter at hand in a document).

Results from the grounded typology for "focus of document" revealed that more than half (*n*=91, 53.53%) of Weiss's scholarship focused on developing social science theory. Here, social science theories are understood as developing a systematic explanation of observations to explain and make generalizations about a social or societal phenomenon. The remaining categories each accounted for less than one-fifth of Weiss's unique publications. The second most common focus was "review," which included interviews, book reviews, bibliographies, and critiques of others' works, and amounted to 18.82% (*n*=32). Publications focusing on research (*n*=26, 15.29%) and methods (*n*=25, 14.71%) were less prevalent.

"Domain of document" intentionally used Weiss's language choices to determine the topic, rather than relying on the discipline in which something was published. Fourteen categories emerged from the data: decision-making, evaluation, evaluation use, evidence-based policymaking, interviewing methods, methodological issues, policymaking, politics and politicization of evaluation, reflections, research utilization, social science & the media,

stakeholder approach to evaluation, survey methods, and theory-based evaluation. The categories in this grounded typology led to the development of two systematic maps of Weiss's work. The first systematic map organized the fourteen minor domain codes into four major categories based on Weiss's categorizations of her work, focusing on evaluation and knowledge utilization (Weiss, 2004, 2012). Categories for reflective practice and methodology indicate the reflective nature of evaluation practice and Weiss's attention to including traditionally marginalized voices in knowledge creation. The second systematic map organized the minor categories around themes within the categories, and the results aligned closely with findings by Mathison (2005) and Newcomer (2015).

Collecting and examining citations made to Weiss's scholarship addressed improving understanding related to the influence of Weiss's interdisciplinary scholarship. Initially, the study pursued the cumbersome process of gathering and cleaning data from Google Scholar. Serendipitously, I uncovered an unexpected source of cross-referenced citation data in Scopus. Including the data from "secondary documents" increased the number of Weiss's publications available for analysis from 39 to 141 (out of 224 possible). The goal of analyzing the citation data was determining if associations existed between the various focus categories and citation behavior in disciplines. The test statistics for the chi-square test for independence showed statistical associations at the $p > .20$ level or above, which is far off the mark of statistically significant. The same lack of statistically significant association existed for the type and domain categories. Even so, the paucity of "statistically significant" support for claims relating to citations in various disciplines to qualities of Weiss's work does not mean practical relationships were absent.

Interdisciplinarity and Weiss's Influence

The study examined the scope of Weiss's academic writing by identifying domains present in her work, and the disciplines in which Weiss's writings were published. The first investigation involved creating a grounded typology of publications around the "domain of document" categories. Grouping the fourteen categories in different ways led to the development of two viable systematic maps. Categorizations in the first systematic map followed from Weiss's belief that her scholarship ultimately addressed two topics: evaluation and knowledge utilization. Creating an overlayed category for public policy was necessary to capture the recurring context in Weiss's writing. The second systematic map separates Weiss's work into what I would term "issue categories" rather than "domain categories." The "issue categories" are politics and policy, use, evaluation theory, methods, and reflections. This categorization of Weiss's work better reflects the concepts and concerns she studied and find support in the categorizations proposed by Mathison (2005) and Newcomer (2015). Newcomer's work uses data from both Google Scholar and Web of Science, whereas the present study examined data from Scopus. Sharing similar findings with Newcomer's analysis, and therefore across the three major sources of citation data lends further credence to the "issue categories" groupings.

The study followed the conceptualization of interdisciplinarity as the "intra-academic integration of different types of disciplinary knowledge" (Frodeman, 2017a, p. 4). As I discussed earlier, contemporary scholarship around the idea of interdisciplinarity identified four typical qualities of good interdisciplinary research: integration, impact, equity, and transparency. At the outset of this study, I incorrectly assumed that the examination and identification of these qualities in work published decades ago would be problematic. Fortunately, this is not the case, at least in the context of Weiss's scholarship.

Through the qualitative examination of citations, it became clear that many of Weiss's works contain evidence of each quality, and her body of work as a whole exhibits all four contemporary qualities of stellar interdisciplinary research. Weiss's publications often address issues requiring integrating knowledge from the traditional disciplines of political science, psychology, and sociology and the more recent fields of evaluation, knowledge utilization, and public administration. Most of her scholarship exists at the intersections of two or more of these fields. In addition to being cited in each of Scopus's 28 subject categories, Weiss's work appears in legislation, court opinions, and non-academic practitioner guides, which suggests her work is impactful and accessible equally to diverse audiences. Further, references to her work both inside and outside academia imply wide use of the knowledge and understandings she developed. The examination of her unpublished materials and the presence of some of her research materials, including coding books and data sets, in the Bureau of Applied Social Research's Archive at Columbia University, point to the continued transparency of her scholarship. Using the hallmarks of "good interdisciplinary research" (integration, impact, equity, and transparency) as a guide leads to the conclusion that Weiss's scholarship was interdisciplinary.

Not only is Weiss's scholarship interdisciplinary, but influences of her work can also be found broadly through academic discourse. The interdisciplinary nature of Weiss's work has a broad reach and perhaps universal applicability. Yet, the influence of her work is difficult to discover through traditional, quantitative, bibliometric methods. Citations to Weiss's work appeared in all 28 Scopus subject categories; however, not all of Weiss's work was cited broadly. Only nine of her publications were cited in more than 19 categories. Regarding "type of document," the nine publications consist of four books, four journal articles, and one book chapter. Both editions of Weiss's textbook on evaluation (Weiss, 1972, 1998) are among the

highly cited documents. Except for "Nothing as Practical as a Good Theory: Exploring Theory-Based Evaluation for Comprehensive Community Initiatives for Children and Families" (Weiss, 1995), all documents focused on providing contributions to theory. The domains associated with nine of these publications point to Weiss's three most influential contributions:

1) The political nature of knowledge generation;

2) The ways knowledge is used in decision-making; and

3) The nature and method of theory-driven evaluation.

These three contributions align with the "issues categories" developed in the second systematic map presented in this study and those identified by Mathison (2005) and Newcomer (2015). The above wording extends beyond Mathison's and Newcomer's focus on evaluation, not as a rejection of the importance of evaluation or an assertion that research and evaluation are similar tasks, but rather as a recognition that both research and evaluation are equally important means of knowledge generation. Further, the more inclusive language aligns closer with Weiss's conceptualization of her contributions and respects the different approaches various fields have to knowledge generation.

The present study did not examine if the way Weiss discussed evaluation in her writing changed in 1979, as suggested by Shadish, Cook, and Leviton (1991a). However, I point out Weiss was awarded her doctorate in 1977 and suggest any change in writing style may be due to having become a peer rather than a student in academia. Further analysis of the way Weiss used language could help determine whether this change occurred.

Conclusions

Citations to Weiss's publications appear mostly in the expected subject areas: social sciences; business, management, and accounting; psychology; decision sciences. Weiss's articles

also primarily appear in journals with these subject attributions. The high proportion of citations in medicine-related publications was initially surprising. However, most of these citations (in sheer number) are to her work on knowledge utilization. Though citations to Weiss's publications appear in all Scopus subject areas, the concentration of citations in the expected subject categories could mean that Weiss's scholarship is not interdisciplinary, but rather, is merely applicable to contexts in a wide variety of disciplines. Earlier I characterized Weiss's scholarship as interdisciplinary based on the four hallmarks of good interdisciplinary research. Lattuca (2001) offers the idea that interdisciplinary can be determined by examining research questions. A future study could examine the questions Weiss's addresses in her scholarship to examine the claim that Weiss's research is interdisciplinary. Though, in practice, a single study can address multiple related research questions, each inherently related to a different discipline. If the author(s) integrate the findings of the research questions into new knowledge, then the study would surely be "interdisciplinary." I doubt if such a study would improve our understanding of Weiss's work, interdisciplinarity, or influence.

Finding no statistical association between the type of document and citation in a discipline is surprising because it does not align with other studies (Bornmann et al., 2008; Gingras & Khelfaoui, 2019; Knapp, 2013; Soós et al., 2018). Not finding a statistical relationship probably results from the comparatively small number of publications analyzed in this study. One of Weiss's articles, "Where Politics and Evaluation Research Meet" (Weiss, 1973d), was printed under two titles and as both a book chapter and an article. The reprintings create a natural experiment for examining whether book chapters or articles were cited more in various disciplines. In this case, however, there is too little data to allow for meaningful statistical analysis. The similar lack of statistical association for the "focus of document" or the "domain of

document" and citations was surprising. Again, the small data set tempers interpretation of the finding. The scarcity of "statistically significant" relationships does not undermine the practical understandings gained through the qualitative aspect of this study, however.

Importantly, the focus of this study is not on whether or not Weiss's work itself is interdisciplinary, but rather determining the nature of the influence of her work. On this matter, it is clear that the influence of Weiss's scholarship crosses and likely transcends the traditional boundaries of disciplined scholarship. Transcending disciplinary boundaries is an aspect of both interdisciplinarity and transdisciplinarity (Klein, 2017). Identifying the influence of Weiss's scholarship as transdisciplinary could lead to important errors of interpretation until a more coalesced understanding of transdisciplinarity evolves, however.

Limitations

Through the course of the study, various limitations to the conduct of the study and, therefore, the potential reach of the study became apparent. Perhaps the most striking limitation comes from misconceptions related to the inherent value of citations and the accessibility of bibliographic data. I will not repeat the discussions concerning theories of citation and issues with measuring academic influence here. Both are found in the literature review. Similarly, I will not recount the myriad issues and concerns related to the availability and reliability of citation data from the chapter on methodology. It is sufficient to say that concerns and issues underlying the theoretical constructs, methodological issues, and data concerns necessarily affect the findings of the research.

The most significant limitation of this study stems from difficulties in demarcating disciplinary boundaries. Similarly, the presence of competing understandings of multidisciplinarity, interdisciplinarity, and transdisciplinarity confound locating Weiss's

influence as one or the other. Lacking consensus around the boundaries of disciplines and their juxtapositions (multi-, inter-, and transdisciplinarity) is another limitation. Even so, the (in)ability to label something with a term does not affect the presence or absence of a phenomenon. Discussions around whether something belongs to one discipline or the other are much like jurisdictional concerns in legal contexts, with the exception that the landscape of thought/wisdom/knowingness is metaphysical rather than physical. Being able to identify particular approaches to knowledge is pedagogically helpful. Though, I do not believe establishing rigid boundaries around any category or type of knowledge provides more than a heuristic tool. The value of this study is neither diminished nor improved by providing the "interdisciplinary" or "transdisciplinary" moniker. Regardless of the term, Weiss's influence is influential in a broad array of contexts.

Research Process

Determining the size and scope of Weiss's scholarship began with a long a process of dispelling my assumptions about information science and library cataloging and journal indexing. I had prior experiences identifying and locating relevant research in systematic reviews and was aware of the difficulties associated with those tasks. However, these studies examined works published during the digital era. Based on these experiences, I naïvely assumed that metadata regarding title, author, publication, and date would be consistent and proactively cross-checked. Instead, I found that publications frequently contain incorrect information about a citation. Scopus and Web of Science work to correct these issues (van Eck & Waltman, 2017), though sometimes identifying accurate citations requires intimate knowledge of a field. For example, citations to publications Weiss never wrote appear in Scopus. Similarly, at least one citation to Weiss's 1998 evaluation textbook is misattributed to "J. Weiss." Google Scholar's

method of data crawlers and unchecked aggregation drastically limit its usefulness, despite its size (Martín-Martín, Orduna-Malea, & Delgado López-Cózar, 2018; Martín-Martín, Orduna-Malea, Thelwall, et al., 2018; Prins et al., 2016). Ultimately, incorrect information in citations complicates identifying all publications by an author and citations to an author's work. Uncovering a method of identifying secondary documents, and therefore a repository of citations to Weiss's publications ultimately allowed the present study to proceed successfully.

The multi-method approach to the study provided few issues to my performing the research tasks. Issues manifested when I began interpreting the results, however. Starting with the qualitative analysis of Weiss's body of work was a necessity, meaning the quantitative analysis would follow. In its current order, qual-quant, the first draft of the discussion fell flat due to the lack of statistical significance. The current version addresses both the qualitative and quantitative findings of the study. If a catalog of Weiss's publications existed before this study, then the order would likely have been reversed. A quant-qual ordering of the study begs the question of whether I would have continued beyond the quantitative portion and illuminates a bigger question relating to how much valuable qualitative research gets prevented by a lack of quantitative results.

Future Research

As an exploratory study, its contribution is two-fold. First, the thorough examination of Weiss's scholarship and influence provides a good example of the findings that can be gleaned from an in-depth analysis of an interdisciplinary scholar's work. Second, the study provides a replicable method to examine the work of other scholars in interdisciplinary fields such as evaluation and knowledge utilization.

The four qualities I propose as being indicative of high-quality interdisciplinary work (integration, impact, equity, and transparency) are based heavily on theoretical understandings of interdisciplinarity and comparatively scant empirical research. Further inquiry into quality makers of interdisciplinarity should examine these qualities empirically. I suggest evaluation and knowledge utilization as a starting point because this study lays the groundwork for studies rooted in the set of disciplinary interactions related to those fields. Exploring foundational evaluation theorists (Shaddish, Cook, & Leviton, 1991) and contemporary central figures in evaluation would increase understanding of the fundamental position of evaluation regarding traditional disciplines. Additionally, historical examination of the topics examined by established evaluation scholars can foster a deeper understanding and respect for the position evaluation currently occupies and possible avenues for increasing the exposure of evaluative thinking in traditional disciplines.

Similarly, examining the work of canonical authors in knowledge utilization (Estabrooks et al., 2008) can help identify gaps in understanding of the field and foster the extension of central theoretical wisdom from innovation diffusion, knowledge utilization, and technology transfer throughout contemporary discussions of evidence-based and evidence-informed activities.

Implications

The hope was that this study's findings would improve the understanding of interdisciplinary influence and lead to the development of appropriate indicators of interdisciplinary influence. Ideally, some of these indicators would be related to citations. Much of the existing literature on interdisciplinary research evaluation mentions the need for in-depth reviews of research products by peers who are sufficiently skilled in interdisciplinary work (de

Oliveira et al., 2019; Huutoniemi & Rafols, 2017; Klein, 2008; McLeish & Strang, 2016). While

the practice is often part of peer review of articles and research funding reviews (König &

Gorman, 2017), it is unknown how many tenure and promotion committees have adequate

reviewers along this dimension. Nevertheless, the findings of the present study suggest that high-

quality, interdisciplinary work can be identified by the presence of four qualities: integration,

impact, equity, and transparency. One could argue that the last three of these qualities apply to all

good research.

 Lacking citation-based indicators of interdisciplinary influence creates an unequal

playing field in determining disciplinary influence and interdisciplinary influence. Presently,

citation-based proxies of academic influence are widely accepted in the academy, despite their

shortcomings. The inadequacy of citation behavior as a comparable proxy for the influence of

interdisciplinary scholarship places interdisciplinary work at a disadvantage (Yegros-Yegros et

al., 2015). However, moving the notion of influence to be based not on quantity, but presence can

increase interdisciplinary work's perceived value. Ultimately, the question becomes whether

being highly influential in one field is preferable to being broadly influential in many contexts.

 The breadth and persistence of Weiss's scholarly influence over the past fifty years

distinguish Carol Hirschon Weiss as a remarkable scholar. Weiss's observations on the political

nature of knowledge generation and the important conceptual use of knowledge were

groundbreaking and continue to influence how scholars interpret decision-making. Her centrality

to the fields of evaluation, knowledge utilization, and policy studies point to her multi- and

interdisciplinary relevance. These observations combine to form an overwhelming conclusion

that recognizes Weiss as a foundational theorist to understanding the role information plays in

society.

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APPENDIX A

Carol Hirschon Weiss's Unpublished Work

Table A

Catalog of Weiss's Unpublished Work Located at the Interdisciplinary Ph.D. in Evaluation Library

Folder	Doc.	Document title or First line of document	Author(s)	Year	Pages	Next draft	Notes
	A	"Social Science Research for Public Policy-Making: The Problem of Drift"	Carol H. Weiss	n.d.	9		Handwritten
	B	"Three View of the Expert's Role in Policymaking: Systems Analysis, Instrumentalism, and the Clinical Approach"	K. A. Archibald	1970	1		Front page of an article from "Policy Sciences 1 (1970), 73-86"
	C	"The sound research/service delivery system"	Carol H. Weiss	n.d.	4	Doc. J	Handwritten; List describing "actors" (p1), List describing "variables describing actors" (p2), Chart examining "effect of x on y" (p3), "model represented by matrix" (p4)
	D	"-Grants for- Social Science Research for Public Policy-Making: An Inquiry into Motivation, Definition, and Drift"	Carol H. Weiss & unknown	n.d.	37		(John/Betsy?) Surmeier's 1st Comments; Typed document with handwritten notes (Not Weiss's writing); Appears to be a research proposal (which would make sense to have a calendar)
	E	"Calendar"	Carol H. Weiss	See notes	1		Assuming a May 1973 start date - completion by 1975, likely the last page of D in this folder

"Research Drift" background and materials (CHW labelled)

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Folder	Doc.	Document title or First line of document	Author(s)	Year	Pages	Next draft	Notes
	F	"The Case for Multiple Advocacy in Making Foreign Policy"	Alexander L. George	1971	2		Abstract from paper prepared for APSA Chicago 1971
	G	"Research Drift"	Carol H. Weiss	n.d.	4		<none>
	H	"The Use of Research in Federal Policy-Making"	Carol H. Weiss & William Glasser	1971 (JUL)	15		<none>
	I	"Human Factors Research…"	Robert R. Mackie & Paul R. Christensen	n.d.	1		Citation
	J	"Utilization of Research: Communication Channels"	Carol H. Weiss	n.d.	3		<none>
	K	"O.L Deniston, I.M.Rosenstock…"	Carol H. Weiss	n.d.	1		Citation
	L	"Stages of Policy-making"/"Types of policy research that are relevant"	Carol H. Weiss	n.d.	1		Handwritten; Side-by-side list of the two topics
	M	"Purposes//Constrained repertoire//Goal Achievement//Organizational Maintenance"	Carol H. Weiss	n.d.	1		Handwritten; Side-by-side list of the two topics - with tangential notes
	N	"For use as Guidance, the organizational…"	Carol H. Weiss	n.d.	1		Handwritten paragraph - likely the last page of another document
	O	"Both these interpretations of the modes of using social science research…"	Carol H. Weiss	n.d.	3	Doc. P	Typed draft

Folder	Doc.	Document title or First line of document	Author(s)	Year	Pages	Next draft	Notes
	P	"Both interpretations take for granted that immediate direct problem-solving…"	Carol H. Weiss	n.d.	6	Doc. R	Typed draft with handwritten annotations
	Q	"Backing off a few steps…"	Carol H. Weiss	n.d.	1		Handwritten paragraph -
	R	"The interpretations in Perspective"	Carol H. Weiss	n.d.	7		Typed and handwritten draft
	S	"Institute of Industrial Relations - Science and the Purposes of Knowledge"	Reinhard Benedix	1975	1		Reprint No 379
Blue Folder	A	"Use of ss by the Federal Gvot (sic) and the Repotg (sic) of S S by the National Media…"	Carol H. Weiss	post-1983	2		Typed
	B	"p.17-20//But when it comes to rptg (sic) ss, …"	Carol H. Weiss	n.d.	3		Handwritten
	C	"6//Transforming Policy Research into News"	Carol H. Weiss	n.d.	4	Doc H.	Typed - dot matrix
	D	"Transforming Policy Research into Public Knowledge: Performance of the Media…"	Carol H. Weiss	n.d.	10		Handwritten
	E	"The Selection Screen//If a policy researcher assesses the pros…"	Carol H. Weiss	n.d.	2		Handwritten
	F	"Transforming Policy Research into Public Knowledge"	Carol H. Weiss	n.d.	3		Handwritten
	G	"'Going public' with research findings is…"	Carol H. Weiss	n.d.	3		Handwritten

Folder	Doc.	Document title or First line of document	Author(s)	Year	Pages	Next draft	Notes
	H	"Transforming Policy Research into Public Knowledge: Performance of the Media…"	Carol H. Weiss	n.d.	8		Typed - dot matrix
	I	"News stories simplify. They present one…"	Carol H. Weiss	n.d.	3		Handwritten
	J	"Translation of Social Science Research Into Public Knowledge"	Carol H. Weiss	n.d.	21		Typed
	K	"Translation of Social Science Research into Public Knowledge//APPAM"	Carol H. Weiss	1984	21		Typed-dot matrix
Folder 1	A	"American Elites' Perception of Political Influence"	Carol H. Weiss	1972 (Aug)	10		Becomes "What America's Leaders Read" (1974). 2 identical copies included in the file; Preliminary Report on American Leadership Study
	B	"Study finds elite doves on the war"	Glenn Fowler	n.d.	2		NYT article on American Leadership Study
	C	"American Leaders and Social Problems: Opinions"	Bureau of Applied Social Research	n.d.	4		American Leadership Study Survey
Files	A	"The Policy-Making Process in a State Board"	Carol H. Weiss	2000	31		Found filed with actual publications; probably unique - might be one of the two papers from Harvard

APPENDIX B

Carol Hirschon Weiss Bibliography
(Chronological by Initial Publication Date)

The following is a complete list of Carol Hirschon Weiss's publications. The list is the result of exhaustive searches and cross-referencing of the collections at Cornell University, Columbia University (including the archive of the Bureau of Applied Social Research), Harvard University (including the Harvard Graduate School of Education Library and the Schlesinger Library), The University of Melbourne, and Western Michigan University. The list does not contain translations. It is organized chronologically by year for the first publication of each document (e.g., article, chapter, book, report) with additional printings of the document nest under the initial publication.

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APPENDIX C

Weiss's Publications Identified by Focus and Domain Categories

Table C

Quick Reference Table Identifying the Documents in Each Focus Cateory by Domain

	Category	Methods	Research	Review	Theory	Theory & Methods
Evaluation	General	79	-	37, 57, 58, 122	1, 3, 7, 8, 20, 25, 29, 33, 40, 74, 89, 128, 147, 150	24, 26, 127, 136
	Politics and politicization of	-	-	-	16, 28, 30, 32, 34, 90, 110, 121	-
	Stakeholder approach	-	-	-	76 & 77	-
	Theory-based evaluation	129	144	153	131, 133, 134, 135, 143, 146, 165	-
	Use	-	156	-	6, 27, 66, 91, 92, 93, 98, 137, 138	-
Knowledge utilization	Decision-making	-	39, 45, 68, 105, 112, 115, 119, 123	83, 100, 152	48, 49, 62, 64, 65, 71, 75, 80, 125	-
	Evidence-based policy	-	166, 168	-	148	-
	Policymaking	-	23, 86, 87, 97, 103, 157, 164	46, 53, 69, 73, 96, 111, 132, 151, 159	42, 43, 44, 47, 52, 55, 60, 61, 67, 72, 78, 84, 85, 88, 99, 101, 102, 106, 107, 108, 109, 113, 114, 117, 118, 126, 141, 142, 145, 154, 167, 169	-
	Research utilization	-	50 & 161	56, 63, 124, 163	15, 54, 59, 104, 130	-
	Social sciences & the media	-	36, 81, 82, 94	41	-	-

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	Category	Methods	Research	Review	Theory	Theory & Methods
Methodology	Interviewing	2, 10, 11, 14, 17, 19, 35, 38	-	18	-	-
	Methodological issues	4, 5, 12, 13, 149	70	158 & 160	-	-
	Surveys	9, 21, 22, 31, 51, 140	-	-	-	-
	Reflections	-	-	95, 116, 120, 139, 155, 162, 170	-	-

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APPENDIX D

Weiss's Publications Identified by Ulrichsweb Subject Categories

Table D

Quick Reference Table Identifying the Documents in Ulrichsweb Category

Ulrichsweb category	First category	Second category
Business and economics	169	98, 99, 146
Business and economics – finance	73	-
Business and economics – international development and assistance	70, 164	-
Business and economics – management	27, 32.8, 32.9, 76, 77, 92, 93, 121, 131, 138, 150, 157, 162, 165, 168	-
Children and youth	88	-
Communications	82, 86, 94	-
Criminology and law enforcement	170	-
Drug abuse and alcoholism	33	-
Education	20, 59.3, 64.1, 67, 71, 76.2, 77.2, 103, 105.1, 110, 111, 115.1, 116, 125, 126, 163	20.2, 134, 137
Education – management	6.3, 100, 105, 112, 115, 119	-
Education – school organization and administration	63, 100.1, 123, 123.1, 130	-
Education research	149	-
Housing and urban development	9, 127, 128, 129	-
Occupations and careers	3, 8, 16.2, 32.6	-
Philosophy	102	-
Political science	10, 11, 18, 23, 30, 36, 39, 41, 42, 43, 44, 56, 60, 61, 83, 95, 122, 132	163
Psychology	12, 16, 20.3, 28, 40, 50, 51, 55, 68, 68.1	58
Public administration	6, 7, 16.3, 32.1, 32.5, 32.7, 44.1, 44.2, 45, 47, 48, 49, 56.1, 59, 59.1, 67.1, 72, 78,	21, 32.3, 44, 52, 57, 59.2, 67.2, 67.3, 68.1, 74, 84, 148

Ulrichsweb category	First category	Second category
	78.1, 87, 90, 97, 98 99, 101, 106, 107, 108, 109, 113, 114, 114.1, 118, 151, 152, 167	
Public health and safety	144	-
Science: Comprehensive works	64, 81, 85, 89, 104	
Social sciences	62, 75, 84, 117, 141	32.2
Social sciences: Comprehensive works	6.1, 6.2, 15, 16.1, 20.4, 24, 25, 26, 26.1, 26.2, 26.3, 32.2, 32.4, 37, 38, 45.2, 45.3, 52, 57, 58, 59.2, 66, 66.1, 67.2, 67.3, 69, 76.1, 77.1, 79, 80, 91, 91.1, 92.1, 92.2, 93.1, 96, 133, 134, 135, 136, 137, 138.1, 139, 142, 143, 145, 146, 147, 148, 153, 155, 155.1, 156, 158, 160, 161, 166	10, 11, 16.2, 18, 20.3, 23, 27, 29.1, 32.7, 32.8, 32.9, 36, 38, 39, 41, 50, 55, 59.3, 64.1, 76, 76.1, 77, 77.1, 86, 87, 90, 92, 93, 94, 102, 106, 107, 108, 109, 121, 127, 128, 129, 131, 132, 138, 140, 150, 157, 162, 165, 168
Social service and welfare	1, 2, 4, 5, 13, 17, 19, 20.1, 21, 22, 29, 29.1, 31, 32, 34, 65, 74, 159	-
Sociology	14, 20.2, 32.3, 35, 45.1, 46, 54, 120, 124, 154	16, 51, 64, 71, 78, 85, 104, 118
Statistics	140	-
Women's studies	53	-

APPENDIX E

Cohen's Kappa Statistic Calculations for Intrarater Reliability

Cohen's kappa is derived by comparing the difference between expected and actual agreement. The statistic is dimensionless and always has a value less than or equal to 1. Interpreting Cohen's kappa is guided by Landis and Koch (1977), for whom a kappa value above 0.80 signifies almost perfect or perfect agreement. As shown in Table A3 the Cohen's kappa for each domain code is greater than .88, suggesting almost perfect agreement in all codes.

Table E

Cohen's Kappa Calculations for Intrarater Agreement

Code/Category	Included in both reviews	Excluded in both reviews	Included in only first review	Included only in second review	Percent Agreement	Cohen's kappa
General evaluation	24	146	2	0	98.84%	0.95
Politics of evaluation	8	162	2	0	98.84%	0.88
Stakeholder approach to evaluation	2	168	0	0	100.00%	1.00
Theory-based evaluation	10	160	0	0	100.00%	1.00
Evaluation use	10	160	1	0	99.42%	0.95
Decision-making	19	151	0	1	99.42%	0.97
Evidence-based policymaking	3	167	0	0	100.00%	1.00
Policymaking	44	126	0	4	97.70%	0.94
Research utilization	11	159	0	0	100.00%	1.00
Social science and the media	5	165	0	0	100.00%	1.00
Interviewing methodology	9	161	0	0	100.00%	1.00
Survey methodology	8	162	0	0	100.00%	1.00
Methodological concerns in research	6	164	0	0	100.00%	1.00
Reflections	7	163	0	0	100.00%	1.00

APPENDIX F

Chi-square Test of Independence Statistics For Type, Focus, and Domain

Table F1

Chi-square Test Statistics for "Type of Document"

Scopus Subject Category	Article	Article-Interview	Book	Chapter	Report
Social Sciences	0.174	0.0811	0.1615	0.9876	4.084
Medicine	1.8893	0.1556	1.7371	0.1910	1.358
Business, Management, and Accounting	0.6265	0.9124	1.0480	0.0062	0.111
Psychology	2.0282	1.6510	2.1485	0.4627	0.564
Environmental Science	14.7458	0.4183	17.1292	0.7684	-
Arts and Humanities	1.4571	-	0.9714	0.7606	0.000
Economics, Econometrics and Finance	0.1140	1.8817	0.3385	0.0093	-
Computer Science	1.2041	-	9.8725	4.3520	-
Agricultural and Biological Sciences	3.0241	-	3.8530	0.0621	-
Engineering	0.7172	0.5978	6.6389	3.7230	-
Decision Sciences	0.7906	7.1175	2.5793	0.8983	0.666
Earth and Planetary Sciences	1.3571	-	0.7843	0.5118	-
Mathematics	0.4821	4.6002	0.1824	0.6499	-
Nursing	3.7750	-	6.1102	0.0334	-
Biochemistry, Genetics and Molecular Biology	0.8398	-	4.8953	1.8868	-
Energy	0.9188	-	0.0123	2.7542	-
Chemical Engineering	0.8371	-	1.2689	0.0092	-
Health Professions	0.0051	-	0.0726	0.0228	-
Neuroscience	0.0135	-	0.2976	0.2947	-
Multidisciplinary	0.1790	-	1.7888	1.0975	-
Materials Science	0.0342	-	0.8242	-	-
Chemistry	0.3071	-	0.0173	-	-
Pharmacology, Toxicology, and Pharmaceutics	0.0275	-	0.2277	0.1340	-
Immunology and Microbiology	0.2248	-	0.1340	-	-
Veterinary	0.0003	-	0.0380	0.0853	-
Undefined	0.5174	-	0.5076	0.0853	-
Dentistry	1.0348	-	1.0151	0.1705	-
Physics and Astronomy	0.0878	-	0.1770	0.0046	-

Table F2

Chi-Square Test Statistics for "Focus of Document"

Scopus Subject Category	Method	Research	Review	Theory	Theory and Method	Sum
Social Sciences	3.178	5.787	0.296	3.110	14.569	26.943
Medicine	11.381	0.895	2.596	8.809	8.233	31.916
Business, Management, and Accounting	4.936	3.863	5.756	0.111	2.798	17.466
Psychology	2.887	10.513	0.158	11.582	7.276	32.417
Environmental Science	7.240	28.587	2.666	32.675	20.594	91.764*
Arts and Humanities	0.319	15.643	2.128	0.494	2.517	21.103
Economics, Econometrics and Finance	1.591	4.076	0.722	0.380	0.3145	7.085
Decision Sciences	0.426	5.592	3.076	1.354	14.262	24.712
Nursing	0.440	6.279	1.406	0.837	9.901	18.865
Engineering	1.281	5.147	0.009	0.497	12.115	19.052
Computer Science	0.500	9.097	0.967	0.123	10.700	21.390
Agricultural and Biological Sciences	0.555	3.223	0.888	0.708	0.271	5.647
Health Professions	4.096	0.313	0.412	1.625	2.428	8.876
Earth and Planetary Sciences	0.792	0.598	0.385	1.475	0.971	4.223
Mathematics	32.027	0.066	1.105	2.438	0.280	35.919
Biochemistry, Genetics and Molecular Biology	8.355	0.209	0.274	0.174	4.055	13.069
Energy	1.584	1.500	0.253	0.504	0.166	4.010
Multidisciplinary	4.588	0.522	0.111	0.254	2.490	7.965
Neuroscience	0.132	7.769	0.111	1.320	0.130	9.463
Pharmacology, Toxicology, and Pharmaceutics	10.905	0.440	0.068	2.115	0.050	13.580
Materials Science	0.751	1.062	0.058	0.175	0.266	2.315
Chemical Engineering	0.683	0.966	0.052	0.476	0.000	2.179
Dentistry	0.376	0.773	0.042	0.810	3.491	5.494
Immunology and Microbiology	0.546	0.773	0.042	0.000	1.173	2.535

*$p < 0.001$

Table F3

Chi-Square Test Statistics for "Domain of Document"

Scopus Subject Category	Reflections	Methods	Knowledge Utilization	Evaluation
Social Sciences	0.018	0.217	30.934	24.330
Medicine	1.642	0.100	7.294	17.902
Business, Management, and Accounting	4.504	3.191	13.894	39.834^
Psychology	1.764	0.766	26.845	56.968*
Environmental Science	-	3.780	115.390	35.709
Arts and Humanities	-	49.081	32.549	7.646
Economics, Econometrics and Finance	0.000	0.159	2.772	0.017
Computer Science	-	0.419	0.0183	2.833
Agricultural and Biological Sciences	-	-	8.889	0.000
Engineering	0.272	0.011	0.192	6.424
Decision Sciences	1.258	0.535	8.298	17.600
Earth and Planetary Sciences	-	-	3.923	0.035
Mathematics	3.271	178.705*	0.291	1.829
Nursing	-	19.347	1.364	5.331
Biochemistry, Genetics and Molecular Biology	-	0.398	0.297	7.441
Energy	-	-	0.878	1.852
Chemical Engineering	-	-	7.039	0.083
Health Professions	-	18.980	0.038	8.056
Neuroscience	-	-	2.746	3.488
Multidisciplinary	-	-	7.918	1.443
Materials Science	-	-	0.154	4.052
Chemistry	-	-	2.107	0.312
Pharmacology, Toxicology, and Pharmaceutics	-	61.141*	1.102	0.134
Immunology and Microbiology	-	-	1.132	4.083
Veterinary	-	-	2.433	0.011
Undefined	-	-	5.569	1.342
Dentistry	-	-	0.915	2.378
Physics and Astronomy	-	-	3.370	0.070

$*p<0.001, ^p<0.05$