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21st century environmental worldviews - a literature review guided by Karl Jaspers' psychology of 1919

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Abstract:

Worldviews guide how we perceive natural environments around us. As environmental crises such as wildfires worsen, it is critical to understand how worldviews unite, divide, and change in individuals and groups and are expressed regarding environmental contexts. The question arises: how do environmental worldviews emerge in academic literature? Karl Jaspers' Psychology of Worldviews from 1919, provides a historical basis and methodological inspiration. This paper conducts a hybrid scoping review to identify categories of theory and synthesize representative articles accompanied by translated highlights of Jaspers' theory. The review concludes by drawing connections to social representations and social movement theories.

Keywords: Environmental Worldviews, Weltanschauung, Psychology of Worldviews, Karl Jaspers, Literature Review

Introduction:

As the frequency and magnitude of extreme wildfires increase globally due to a changing climate (Cunningham et al., 2024; Richardson et al., 2022), consensus to remedy environmental crises becomes increasingly urgent. California’s intensifying wildfire events, which are expected to increase (Goss et al., 2020), underscore the need for communities to organize and develop adaptation and mitigation strategies. While discourse about direct causes and increased wildfire risk cross political divides, as demonstrated in Oregon, consensus around global root causes such as climate change remains polarized (Hartter, 2020). Nuanced differences in scope when communicating about environment are often a

matter of worldview. Diverging perspectives on systems-level causes of environmental crises challenge developing dialogue and building collective capacity to address threats.

Where *environment* starts and ends, and how definitions are applied, is highly contextual. *Environment* is defined as "the physical surroundings or conditions in which a person or other organism lives, develops, etc., or in which a thing exists; the external conditions … affecting the life, existence, or properties of an organism or object."[1] The definition raises question about the extent of conditions implied. According to Young (1987, p. 84-85), environment has become an "easy and individualist code word" which is a "relative word, relative to organism (or object)." Communication about natural environments relies on underlying assumptions. There is a need for measures of individuals' fundamental understanding of how the world is seen and engaged with to disentangle how the concept of environment is subjectively and objectively defined, experienced, and applied.

Worldviews, "sets of beliefs and assumptions that describe reality" (Koltko-Rivera, 2004, p. 1) that function as a "map of reality that people use to order their lives" (Rousseau, 2018, p. 3) theoretically and empirically bridge the gulf between objective reality and factors constructing subjective experience. Worldviews have been applied as a mediating factor in analysis of how people perceive environment-related topics from social-paradigm shifts (Dunlap & Van Liere, 1978, 2008a)[2] to wildfire risk and policy (Howe et al., 2024).

[1] Anon. 2023. "Environment, n." in *Oxford English Dictionary*. Oxford University Press.
[2] Dunlap & Van Liere 2008a includes a reprint of the original 1978 article

The empirical study of worldviews developed in the social sciences and philosophy of the early 20th century (Jaspers, 2019). Karl Jaspers' 1919 "Psychologie der Weltanschauungen [Psychology of Worldviews], originally a German text, comprehensively introduces worldviews yet is relatively unknown due to the lack of a complete English translation. Jaspers while transitioning from clinical psychology into philosophy,[3] outlined a research approach to worldviews. He aimed to illuminate "the last position of the soul, and what moves the soul" (Jaspers 1925, p. Preface).[4] Jaspers identified that "in the battle of scientific perspectives and living personalities, the logical and empirical do not play the sole role and carry the same weight for everyone… there was almost always something else to be felt" (Jaspers 2019, p. XXXVIII).[5] This something else is a communicative gap that worldviews explain. Worldview research can support projects that aim to identify shared views and improve communication to facilitate pathways for consensus.

[3] Jaspers (2019), Psychologie der Weltanschauungen, Gesamtauflage. Einleitung des Herausgebers
[4] Jasper (1925) Psychologie der Weltanschauung, Dritte Auflage. Vorwort zur Ersten Auflage (my translation, original text in Appendix A, according to footnotes) The third edition is substantively comparable to previous and later editions.
[5] Jaspers (2019, p. XXXVIII)

Literature Review:

Prior to reviewing literature of EVWV, this paper situates root concepts of environment, worldviews, and theories and research that combine them. Theory on how concepts gain meaning, social influence and are communicated are also a starting point to understanding worldviews.

Social Influence, Meaning-Making, and Communication:

Environment and worldviews, while common terms, are complicated by the scope and meaning they refer to. Common sense and scientific applications differ for worldviews (Alessiato, 2022), given popular use without precise definition (Vidal, 2008), as for environment (Young 1987). Meaning, as defined by Luhmann, (1990, p. 88) "can only be understood in context." Bounding context entails bounding environment and worldviews, all of which are interrelated. The dialogical theory of communication provides theoretical grounding by focusing on the "social, interactional, and contextual" as described by Linell (2009, p. 12). The theory outlines the situational and constructive linkage of communication and cognition and addresses the persistent challenged of scope. Linell (2009, p. 18) advocates for moderate and constrained holism, applying constraint to effectively analyze a communicative context/space, which can be extended to analyzing EVWV.

Several theories clarify how ideas are established and have a social existence. Fundamentally, inter-subjective and inter-objective relations, "constrain human interaction" (Sammut and Bauer, 2021, p. 15). In Inter-objectivity, proposed by Latour (1996) while studying the relations of simians, objects mediate and enable social interactions. In Intersubjectivity, defined as "the variety of relations between perspectives" (Gillespie &

Cornish, 2009, p. 19), "parties orient in the orientation of others" and construct "common ground" providing "a joint frame of reference" that enables interaction, (Sammut and Bauer 2021, p. 87). Sammut (2010, p. 455-56) states that "insofar as human relations are framed by objects in their environment, their relations can be characterized as inter-objective" and adds Moghaddam (2003, 2006) finding that inter-objectivity enables intersubjectivity between groups. Sammut (2010, p. 460) concludes, that human relations "are framed not just by subjects but also by objects in a way relative to the objectifications of particular cultural groups" and substantiates this observation citing Lewin (1951, p. 919), that behavior is best understood and predicted seeing persons and environment "as one constellation of interdependent factors." Bronfenbrenner's (1979, 1994) Ecological Model of Human Development/Systems Theory reinforces this finding. Relation to features in environment underlies perceptions and relations to one another and clarifies EVWVs' importance.

A Brief History of Environment:

The term environment has a common-sense, scientific, and movement-associated meaning. *Environment* summarized, is emergent from the objective features in the space around a subject, prescient to the context of application. Variance in application of the term has epistemological roots, from the French words *environ* or *environner,* which Young (1987, p. 86) defines as meaning "around" or "to surround/encompass", which Jessop (2012) substantiates and mentions as first included in the Oxford English Dictionary in 1603. Young traces *environ* to the Old French *virer* and *viron,* which meant to "circle", "circuit", or "country around" and elaborates that the word infers the totality of all that surrounds while the root verb infers an active, inter-action-oriented application. This bipartite definition reveals a paradox in *environments'* scope between infinite outer limits and proximate bounds.

Coinage and use of *environment* also emerged from a translation by Thomas Carlyle in 1828 of Johan Wolfgang von Goethe's *Wilhem Meisters Apprenticeship* (Jessop 2012*).* The German word *Umgebung* translated as "Environment of circumstances," incorporated the "dynamic/vital relationship of individual to general/universal" (Jessop 2012, p. 712), and included a mystical, and ambient feeling with the term. Carlyle's coinage during the Scottish Enlightenment and early Industrial Revolution reflects questions about how mechanization and technological change would affect humanities relation to nature and to human nature itself (Jessop, 2012).

Critical discourses about environment, already present in the 20th century, accelerated as the term became associated with the environmental movement, which Bauer (2015) succinctly summarizes. Environmentalism begins with humans' paradoxical relation to nature, where nature is admired and something to act against, which can be traced to the Western Judeo-Christian tradition, that nature is man's dominion. As interaction with nature, changed toward exploration in the 18th century, views shifted toward romanization. Bauer (2015, p. 70-71) concludes that different views of nature are "typified… in historical changes in attitudes, of concepts, and of metaphysics," and notes attitudes' shift from "being in-awe-of, via domination, back to the stewardship of sustainable management …hand in hand with a semantic shift from 'nature' to 'environment' in common parlance." Though social mobilization for causes such as conservation have longer histories, Rachel Carson's book, *Silent Spring* (1962), publicizing destructive impacts of pesticide use, generally marks the beginning of environmentalism (Bauer, 2015). Since then, environmentalism has grown as a social movement and extends to climate change.

An Introduction to Worldviews and Karl Jaspers' Psychology

A worldview is personal, unique to an individual, yet also abstract, general, shared by groups, and embracing a sense of scale situating individual experience in infinite possibility. Worldview(s) are dualistic similarly to environment. A worldview transcends the local to global and depends on the environment in which it is applied, yet specifying an environment depends on worldview. The term *worldview* originated in philosopher Immanuel Kant's coinage of the German "Weltanschauung" World – way of seeing/Way of seeing the world (my translation) in 1790.[6] The term's application grew from philosophy to numerous academic disciplines notably psychology, sociology, and anthropology.[7] Immel (Jaspers, 2019, p. X) outlines that worldviews first described a faculty to reason, conceptualize and act in the world, and that over time, *worldview* through the application of Goethe and Schleiermacher came to define the result of personal development, where a subject cognitively constructs their lifeworld.[8]

In the early 20th century, "the development of worldview theory and answering the worldview question resulted from efforts to come to terms with and make sense of a deeply destabilized time, the signature of which was the individual search for meaning…" (Immel in Jaspers, 1919, p. IX).[9] Jaspers stated that "a psychology of worldviews can only be of relevance in times of individualization. For cohesive times, in which a worldview is a given, and the same for all, there can only be a social psychology of worldviews"[10] (Jaspers 2019, p. 55). While a psychological approach to worldview theory grew in parallel with value

[6] Kant, I. (1790), Kritik der Urteilskraft, *AA V. 255.*
[7] For an overview of Worldviews in Psychology see Koltko-Rivera (2004), Alessiato (2022) for a history of the concept, and Vidal for elaboration of the root concept.
[8]Jaspers (2019, p. X) Immel citing H. Thomä: »Weltanschauung«, in*: Historisches Wörterbuch der Philosophie, Bd. 12, 453–454.* (My translation, Appendix A for corresponding original text)
[9] Jaspers (2019), p. XIV, (ibid.)
[10] Jaspers (2019) p. 55, (1925) p. 39, (ibid.)

philosophy, and phenomenology, and theoretical aspects are incorporated, Jaspers differentiates his theory, and explicitly avoids prescriptiveness, or value judgements, as is iterated in the preface. Methodologically, Jaspers aims to highlight the work of "uncommon individuals" (*seltener Menschen)*…who "uncovered the structural interrelation and connection of the life of the soul" (Immel in Jaspers 2019, p. XXXVII) which provides an objective basis, to structure a psychology of worldviews. The systematic representation of the structure, emergence, interrelation, and behavior of psycho-historical constructs that define human experience is unique in its breadth and depth. Jaspers' format culminates in a valuable and arguably underutilized cross disciplinary meta-theory of philosophy and psychology, which can contextualize theory and research today.

Worldview Research in Practice

Worldviews have been applied in cultural studies (Douglas and Wildavsky, 1982), theology (Naugle, 2002), systems studies (Rousseau, 2018), negotiation and communication (Noblet, 2013), technology acceptance (Bauer, Sartawi, and Sammut, 2023) and numerous other fields. Common-sense application of the term has led to various interpretations and applications. Worldview theory, and components thereof, applied under other names, often address similar constructs. Sammut (2019), and Mifsud and Sammut (2023) find that various research programs including symbolic universes (Salvatore et al., 2018), social axioms (Leung and Bond, 2010), moral foundations (Haidt, 2012), mentalities, mindsets, etc. share structural components defining persons' engagement with the world around them. This is comparable to worldviews. Sammut (2019, p. 427) hypothesizes that "mentalities, … provide human beings with the capacity for environmental calibration." Sammut's observation highlights that literature on worldviews far exceeds what is attributed to one term, since diverse research matches components of the concept. Similarly to Jaspers' method, this paper

will conduct a systematized review of key influences, in this case, studies regarding EVWV under the explicit or implicit frame of the term, to further characterize the concepts and relation of worldviews and natural environment.

Environment and Worldviews

Worldviews have been applied in environment-related social sciences research for example, to measure values and attitudes to sustainability and environmental communication (Noblet, 2013), explore socio-environmental conflicts (Özkaynak et al., 2023), measure relationships to sustainable lifestyles (Hedlund-de Witt, 2012), and measure support for wildfire risk mitigation policies (Howe et. Al., 2024). Hedlund-de Witt (2013) traces philosophical roots of worldviews and promotes a historical contextual method to worldview research while outlining the Integrative Worldview Framework's application to the sustainable development debate yet omits Jaspers (1919) likely due to text being untranslated from German. Papers also implicitly involve worldviews for example, regarding the social construction of communication about wildfire (Paveglio, 2009), and regarding contributions of social representations and social practices theories to understand pro-environmental actions (Batel et al., 2016). The question emerges if worldview research where concepts comparable to worldviews are applied yet not mentioned as worldviews, represent worldview instruments. Alternatively, the New Environmental Paradigm (Dunlap, 1978, 2010) measures an environmental worldview yet, raises the question if the construct measured can be seen as a worldview. Literature reviews of scales measuring Environmental Concern (Cruz, 2019), Cultural worldviews and environmental risk perception (Xue, 2014) and Environmental Connectedness (Keaulana, 2021, Tiscareno-Osorno, 2023) furthermore incorporate worldviews and measure worldview components. Technicality and nuance are inherent in the concept since different factors support the formation of a contextually and subjectively

situated worldviews. Jaspers' method, isolating *unique* perspectives that traverse history and describe the structure, behavior, and theory of worldviews, introduces objectivity, communicates an enduring concept, and provides a model for research.

Research Question: How do environmental worldviews emerge in academic literature, and how do these relate to Jaspers' Psychology of Worldviews defined over a century ago?

Methodology:

This research design focuses on how the concept of environmental worldviews is represented in academic literature. The method will proceed in two steps, a structured search to define literary categories, and identifying and synthesizing papers representing categories.

Stage 1: Reviewing the literature

This stage takes the form of a hybrid literature review to gain an overview of the application of environmental worldviews in literature. As Watson and Webster (2002, p. xxiv) define, reviews either analyze and synthesize a mature topic to extend research or explore an emerging issue to propose new theoretical foundations. Reviewing environmental worldviews, includes both reasons, which guide this research in introducing Jaspers' century-old theory next to modern literature. Yet, the plurality of interpretations, naming conventions, and derivative applications of EVWV challenge purely systematic and algorithmic search strategies. As Bem (1995, p. 172), quoted by Watson and Webster (2002, p. xiv), states, "a coherent review emerges only from a coherent conceptual structuring of the topic itself." This paper strives for conceptual coherence and saturation of the concept of EVWV by defining papers that represent categories and provide insights that extend to broader literature.

The aim prior to the database search was to become acquainted with existing literature and to identify papers and associated keywords that represent EVWV-related constructs. The pilot entailed searching "environmental worldview" in Google Scholar, reference snowballing, and conversations with colleagues. After test searches, a comprehensive title and abstract keyword search protocol was developed (See Appendix B).

The formal component of the search was inspired by the PRISMA extension for Scoping Reviews reporting guidance.[11] The keyword search procedure is accompanied by a snowball search, where snowballing entails following references cited in a paper (Sayers, 2007). Snowball searches as part of a hybrid search strategy help identify relevant studies (Wohlin et al. 2022) and a hybrid search strategy includes two systematic search approaches. The search methodology departs from PRISMA review standards in the categorization of papers and iterative application of snowball searches and pilot material to represent categories and the concept of EVWV comprehensively.

Databases searched included Greenfile via EBSCO[12], known for interdisciplinary environment related publications, and APA PsycINFO via OVID[13], a standard for psychological literature. The title and abstract keyword search protocol was applied in both databases for all historical English language results up until June 12th, 2024. Thereupon duplicates were removed, and papers were removed that did not meet an initial title and abstract screening for relevance along predefined criteria (see Figure 1).

[11] Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Annals of Internal Medicine 2018; 169(7): 467-473.
[12] "GreenFILE https://www.ebsco.com/products/research-databases/greenfile
[13] "APAPsycInfo https://www.apa.org/pubs/databases/psycinfo

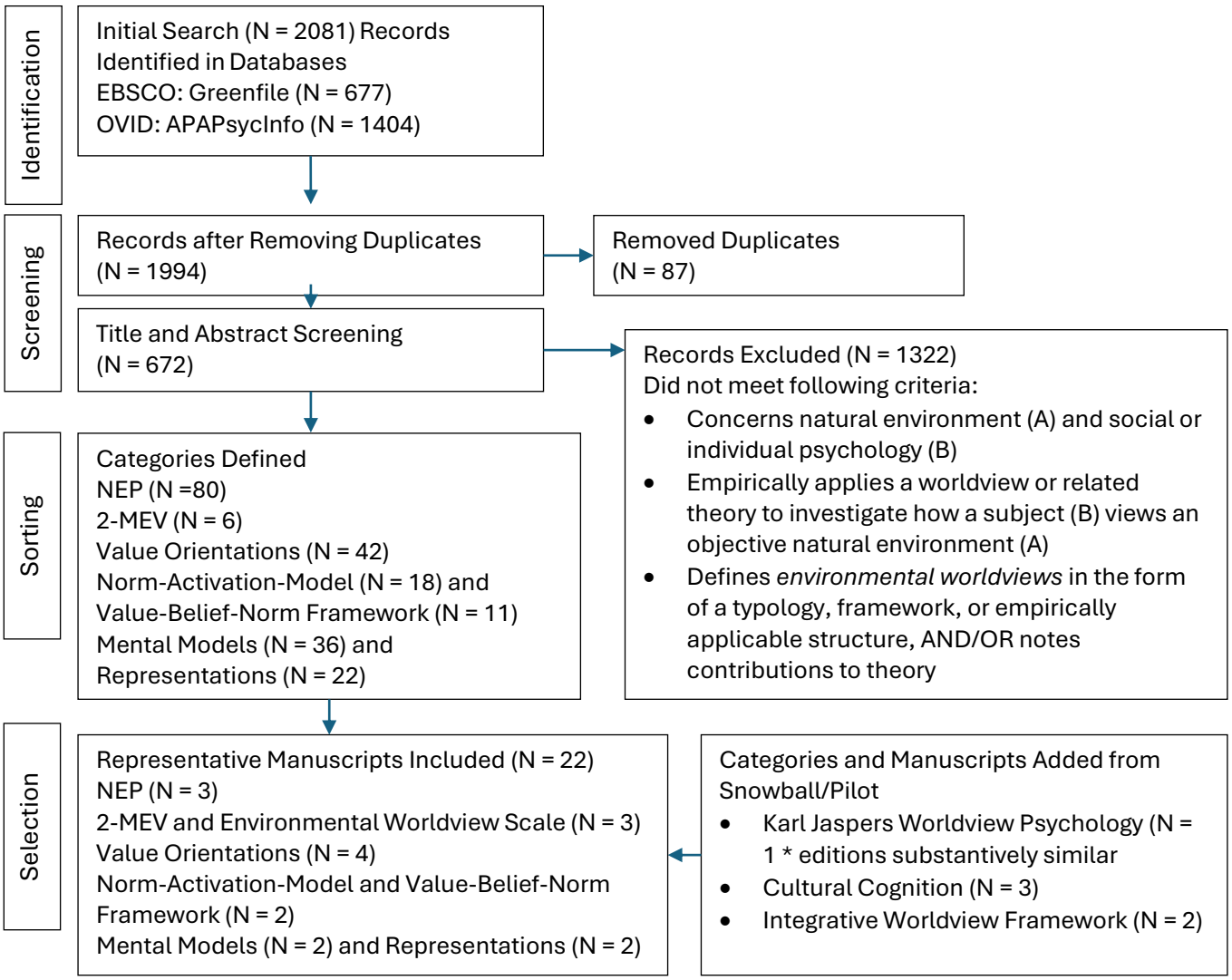

Figure 1 PRISMA Flowchart Diagram

Following the screening, papers were sorted by categories of approaches to worldview theory based on the number of results, and importance highlighted in the pilot search. Notable categories not directly emergent in tiles/abstracts were added. Papers were selected based on their fit for the screening criteria, earliest publication year in the search dataset, and ability to provide insight into theory. Worldview theory from books or where digital access is limited, are mentioned, yet excluded from deeper review. Bundles of papers defining traditions of EVWV research are tabulated and summarized.

Table 1: Representative Papers

	Author, Year	Model	Method	Connection to EVWV	Search Type
1	Jaspers, 1919	Psychology of Worldviews	Theoretical	Worldview Theory	Pilot
2	Dunlap & Liere, 1978, 2008a	NEP	Quantitative	Worldview Comparison	Search & Pilot
3	Dunlap et al., 2000				Search & Pilot
4	Dunlap, 2008b				Search & Pilot
5	Kahan, 2012	Cultural Cognition		Cultural Worldviews	Pilot to Snowball
6	Chuang et al., 2020				Pilot
7	Howe et al., 2024				Pilot
8	Hedlund-de Witt, 2012	IWF	Theoretical	Worldview Meta-theory	Pilot
9	Hedlund-de Witt & Boersema, 2014		Quantitative		Pilot to Snowball
10	Blaikie, 1992	Ecological WV Scale		Ecological Worldview	Search
11	Wiseman and Bogner, 2003	2-MEV		Factors of Worldview	Search
12	Bogner and Wiseman, 2006				Search
13	Stern,Dietz, & Kalof, 1993	Value Orientations		Worldview components	Search
14	Stern and Dietz, 1994				Snowball
15	Stern, Dietz, & Guagnano, 1995	Value Orientations Contextualize NEP, NAM		Worldview contextualized	Search
16	Stern, Dietz , & Guagnano, 1999	VBN		Worldview theory extended	Snowball
17	Steger et al., 1989	Value orientations	Quantitative	Worldview Synthesis	Search
18	Van Riper and Kyle, 2014			Worldview Subset	Pilot
19	Shepardson, 2007	Mental Models	Mixed		Search

20	Jones et al., 2014			Comparable Construct for components of Worldview	Search
21	Buijs, 2009	Images/Representation of Nature			Search
22	Hovardas & Stamou, 2006	Social Representations	Qualitative		Search

Elaborated Table in Appendix C

Stage 2 and 3: Analysis and Synthesis

Analysis and synthesis closely relate to the search since results guide the inclusion of further papers. Adding reference papers contributes to Step 1 for an iterative process of building a more defined overview of papers and related theories.

Including Jaspers' worldview psychology is a novel methodological approach to English-language worldviews as far as is apparent in current literature. The review still qualifies as a scoping review since scoping review "do not adhere to strict methodological rules nor necessitate assessment of quality of evidence." Gottlieb (2021, p. 1) Search screening and categorization of papers was followed by identifying representative texts and expanding the search, at times beyond the initially screened database material.

Hypothesis: Academic literature and applications of environmental worldviews expand on and complement Jaspers' Psychology of Worldviews.

Results:

Categories that define literature of EVWV include the New Environmental/Ecological Paradigm (NEP), 2-MEV and Environmental Worldview Scale, Value Orientations, Value-Belief Norm Framework (VBN), Mental Models, and Representations. Categories added from the pilot search include Cultural Cognition, the Integrative Worldview Framework, and

Karl Jaspers' Psychology of Worldviews (1919). Categories overlap in their frequency of mentions, and counts are not analyzed further since multiple theories and models are often combined, such as the NAM in VBN theory, and value orientations in the NEP. Worldviews explicit/implicit naming is not analyzed for the same reasons. Results summarize studies representing each category.

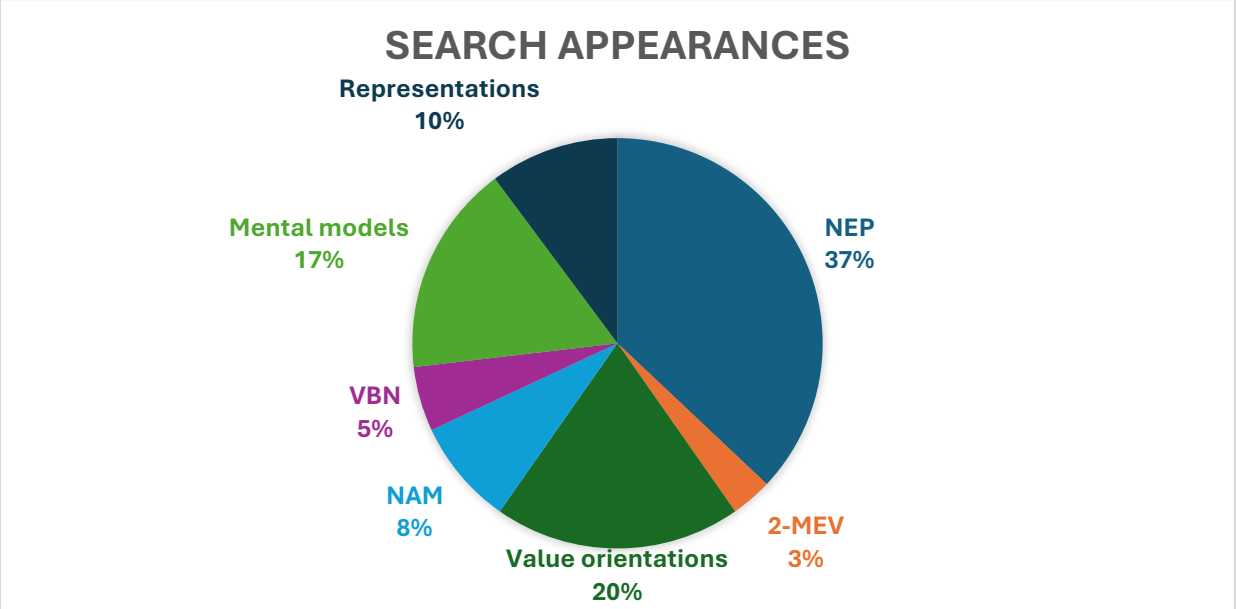

Figure 2 Search appearances by category, accounting for 216 papers (32.14%) of results

Karl Jaspers' Psychology of Worldviews

Jaspers' Psychology crosses the disciplines of philosophy, psychology, and history. Components of Worldview(s) are methodically assembled to provide an overview of the concept. Jaspers defines a worldview as "something whole and universal...which elicits itself in valuations, how one designs one's life, fate, and in the experience of ranking values,"…worldviews are about ideas, subjective experience, attitudes, and the objective concrete form of the world. (1925, p.1).[14] Jaspers defines the space between subject and object as transcendental forms and ideas that are described through the analogy of latticework [*Gitterwerke*] (p. 25). "Depending on which latticework the subject looks through, specific

[14] **Page numbers correspond to 1922/25 editions.**

forms of objects will be visible within the scope of particular psychological experience" (p. 26).[15] Latticework constitutive of substructures of ideas, define worldviews. Studying worldviews is to study ideas that negotiate subjective and objective states. Jaspers defines the principal components of worldviews as Einstellungen [Orientations], Weltbilder [World-images], and Das Leben des Geistes [Life of the Ghost/emotive states][16].

Kant's classification of ideas formed Jaspers' theoretical basis for worldview theory and aligned Jaspers' work with early 20th century Neokantianism (Immel in Jaspers, 2019). However, worldview study, according to Immel (p. XIX), also differentiated experimental psychology and philosophy, known as the Psychologism Controversy. In this context, Jaspers introduced Verstehende Psychologie [An Understanding Psychology], aligned with Jaspers' contemporary, Max Weber's, "Verstehen" and Verstehende Soziology. Weber's comparative historical sociology and development of the concept of "Verstehen" came during a time of methodological controversy in the social sciences in the early 20th century (Hewa 1988). As Hewa (1988, p. 144) defines, "Verstehen was originally developed by Dilthey and Simmel as a method for the study of human society...it was interpreted as an attempt to understand the 'inner-motives' of the acting individual. Contrarily, Weber's Verstehen was defined as a method of understanding the 'subjective meaning' of social action." Jaspers extended Verstehen into the emerging discipline of psychology, and as a guiding ethic to worldviews. Psychological historical comparisons form empirical evidence for Jaspers' theory to categorize, catalogue, and contextualize elements of worldviews, to define general appearances that illuminate their multiplicity and the structures underlying views. The depth and breadth of Jaspers' synthesis provides enduring applicability to the study of worldviews.

[15] Quotes and page numbers are provided for proximate-literal translations of note.
[16] Jaspers (1925). My translations

Jaspers' Worldview Components:

"Einstellungen [Orientations], are also known as functions, and every orientation can be filled with limitless contents" (1925, p. 51). Jaspers outlines his method, to systematize orientations as progressing from the subject-object dichotomy between an I and an Object to differentiate between self-reflective and object-oriented orientations (p. 51). Each orientation is divided into further subcategories which are iteratively outlined and contextualized with socio-historical evidence. An interesting sidenote is Jaspers' (p .51) statement that "people can only enter into communication to reach understanding, when within the same Orientation," asserting the role of worldviews in communication.

Weltbilder [World-images] are described as that, "from a psychological perspective the Subject sees Orientations, while the Objective sees World-images" (p. 141). Images define the objective world, and while not existential, are mobilized by the strength of emotive states [Geistestypen]. Jaspers states that "Under the World-image, one can also understand the totality of objective content that one person holds. Imagining a concentric circle with a periphery, with a person in the middle, one would see orientations and functions from the perspective of the person, that are empowered by what is contextual, in the objective world of images one is enclosed within in the subject-object differentiation" (p. 141). World-images, as defined by Jaspers can also be seen as Gehäuse [housing]. Images are categorized as sinnlich räumlich [sensory-proximate], seelisch-kulturell [soul-like-cultural], and metaphysical. Notably, Jaspers provides three environment-related images, under the umbrella of the sensory-proximate world-image. These are naturmechanisch [nature-mechanical], natur-geschichtlich [nature-historical], and naturmythisch [nature-mystical].

The nature-mechanical image is experienced through analysis and abstraction, which quantifies and deconstructs the proximate world, via the methods of mathematics (p. 158). In the worldviews generated together with this image, "nature defined in laws is calculated and therefore conquerable…nature becomes a tool of the Ghost [Mind], as an apparatus, whereby nature becomes abstract, and generalized" (p. 158). Atomistic empirical and logical approaches are characteristic of this image.

The nature-historical-image sees nature as a multifaceted whole and is "built on a recognition of unique qualities and forms recognized and understood in their rich sensory appearance" (p. 160). This means making sense of nature via the recognition of complete phenomena in terms of their interconnections instead of laws. Nature is seen in wholes, for example as Jaspers states, seeing a complete insect, or mountain, and "a morphological sense for all that has form" prevails (p. 160).

The nature-mythical-image is non-objective-experience. "The mood of a landscape is in its experience phenomenological, the subject sees the mood of the objective/proximate, of the landscape" (p. 161). This image often emerges in poetry or myth and is "a limitless intertwined and nuanced subjective reactivity to Naturstimmungen [moods of nature], natural forms, and natural processes" (p. 161). Nature-mystical images have deep roots in human history, because of the potential for connections and analogies, which influence the application of other images. Jaspers (p. 163) elaborates that the three images of nature can coexist and be combined, yet the most defined forms emerge in singular expression.

Lastly, Jaspers outlines the Life of the Ghost [Emotive States] which combine value orientations and images. "Emotive states are complete forms provided intuitively, which after recognizing their appearance, can be constructed in terms of schemas, as a combination of opposites and permutations of preemptive elements" (p. 219). Jaspers' aim is to communicate

Anschauungen [perspectives] not mechanically as schemas, but through understanding and feeling of emotive states (p. 220). Value orientations are revisited, before states and the transitions therein are explored. Next to Nihilism and Skepticism, there are "Der Halt im Begrenzten" [Footing in Limited Situations] and "Der Halt im Unendlichen" [Footing in Infinite Situations].

Footing in Limited Situations defines the human desire for stability, in fixed worldview structures [Gehäuse] (p. 304), and how worldviews change. Because of the overwhelming nature of relativizing reality, general imperatives, and traditions, enable footing to be proximally and objectively expressed and rationalized by providing material to teach and learn (p. 305). Psychological structures providing safety and security, insulate from Grenzsituationen [Border situations]. Where nihilism is the destruction of Gehäuse, structures can alternatively be "constructive and ever-growing and evolving and living, where in contrast a finished form is chosen and therefore mechanical and unliving" (p. 305). The statement that "all emotive states share rationality…" (p. 306) is notable, and elaborated in that "intellect and reasoning is in relative periphery to instincts, desires, and ideas." This idea expresses that rationality is contextual and a basis of worldview processes. Transitions into the Limitless Situation, where paradoxes and situations beyond understanding emerge are where worldviews are most concrete and powerful because of the desire to understand totalities (p. 326). Jaspers outlines that development in life is an ongoing process and friction between appreciating the stability of accepted structures and striving for understanding the unknown which in turn destabilizes previously accepted structures. This process leads to an iterative development in worldview.

See Appendix D) 1) for comments on Jaspers' Der Lebendige Prozess (The Living Process).

Jasper's worldviews chart the relations of antinomies that one navigates, and which come to constitute views. While Jaspers' focuses on the individual, he elaborates that processes of Umschmelzung [reconstitution] can also be seen in larger historical processes, and that these phenomena often mirror and preempt one another (p. 284). Furthermore, the life of the ghost and associated worldviews are not a continuous development, but interrupted by crises, which introduce novel material and prompt change, whereupon new structures of meaning need to be constructed (p. 337). Jaspers (p. 375), repeatedly mentions the role of communication as critical to understanding the self, other, and world around.

The New Environmental and New Ecological Paradigms

The New Environmental Paradigm scale was first introduced in 1978, by Dunlap and Van Liere to measure the transition from the Dominant Social Paradigm (DSP), seen to be anthropocentric, to an eco-centric New Environmental Paradigm (NEP). Paradigms are equated to world views (Dunlap 2008a). As Dunlap (2008b, p. 5) later reflected, the measure was inspired by wanting to "ground and expand my interest in political cleavages over environmental issues" at a time of a perceived shift in America's DSP.[17] The emergent science-driven ecological worldview of the 1970s challenge to the DSP (Dunlap 2008b) inspired the aim to "conceptualize and measure it (the NEP) along with the DSP. …as a paradigm or worldview" (Dunlap 2008b, p. 6). Dunlap developed a multidimensional scale, drawing from political ideology, and incorporated three prominent themes of scientists' and activists' environmental literature: "existence of ecological limits to growth, importance of maintaining the balance of nature, and rejection of the anthropocentric notion that nature exists primarily for human use" (Dunlap 2008, p. 6). Eight pro-NEP items and four anti-NEP

[17] See appendix D) 2) for comments on Dunlap's inspiration

items (2008b, p.7) were included in a mail survey sent to a representative sample of Washington state residents and environmental organization members.

The study found high internal consistency across the 12 items, a Cronbach's alpha of .813 for the General Public Sample and .758 for the Environmental Organization Sample (2008a, p. 23), and that internal consistency substantiated a worldview. Dunlap decided to keep all 12 items and transform the measure into a summated scale. However, Dunlap (2008b notes shortcomings of the original scale, pro/anti-NEP items' unequally balance, the limited ability to address differences between surveyed attitudes and behaviors, and that socio-psychological theory on attitudes, values and beliefs wasn't incorporated further.

Addressing limitations of the 1978 NEP scale, Dunlap, et al. (2000) developed the New Ecological Paradigm Scale. While the initial NEP saw slow acceptance in the 1980s (Hawcroft & Milfont, 2008), Dunlap (2008, p. 7) credits accelerated use in the late 1980s and through the 1990s with that "environmental issues were no longer confined to relatively localized" issues and due to greater awareness around implications of humans' influence on global ecosystems. Dunlap (2000), notes a growing consensus about the NEP item's ability to measure beliefs and that the scale measures an environmental worldview. Responding to a critique by Stern, Dietz, & Guagnano (1995) mentioned by Dunlap (2000) that the original NEP was not sufficiently grounded in socio-psychological theories of attitude structure, Dunlap (2000, p. 428) defended that "beliefs about nature and humans' role in it as measured by the NEP items appear to constitute a fundamental component of people's belief systems vis-à-vis the environment." Factor analysis of the NEP found three key dimensions, *balance of nature, limits to growth, and human domination of nature* (Dunlap 2000, p. 430). Relatedly, the initial scale's validity prompted questions if the NEP measured a single

construct or multiple dimensions. Following Cotgrove (1982) and Milbrath (1984) application of bipolar items to measure DSP support, Dunlap developed items about beliefs about the finite vs infinite nature of the world for the revised scale (Dunlap 2008b). The revised NEP measures degrees of endorsement of an ecological worldview. The new scale added items related to human exemptionalism and ecocrisis and changed the name to ecological, incorporating more system-oriented and period-specific terminology (Dunlap 2000, p. 432) Three items were added to measure a total of "five hypothesized facets of an ecological worldview: *the reality of limits to growth, anti-anthropocentrism, the fragility of nature's balance, rejection of exemptionalism, and the possibility of an ecocrisis* (Dunlap 2000, p. 432). The measure was again sent via a mail survey to a representative sample of Washington State residents. Internal consistency improved to 0.83 and was confirmed to "measure a coherent belief system or worldview" (p. 435). Reflecting on applications of the scale, Dunlap (2000, p. 437) noted the longitudinal study of water use restrictions by Arcury and Christianson (1990, p. 404) which found that "critical environmental experience can accelerate change in environmental worldview." A limitation of the NEP is the non-global development (Dunlap 2008b), yet the scale provides a starting point for research. The revised NEP according to Dunlap (2000), should support measuring changing acceptance of a new ecological worldview and the effect of new information and experiences, which may be influenced by socio-contextual factors.

Constructs of Note, Beyond the Database Search

Cultural Cognition

Cultural Cognition, while not present in the title/abstract database search, is a EVWV construct prominent in the pilot search. Cultural Theory of Risk and the group-grid model was proposed by Douglas and Wildavsky (1982) and operationalized into Cultural Cognition

by Kahan (2012). According to Kahan (2012), cultural cognition measures cultural worldviews, which are the primary explanatory variable in the Douglas-Wildavsky theory of socially constructed risk perceptions. The group-grid model outlines two axis, from individualism to communitarianism, and hierarchy to egalitarianism (Kahan 2012). Elaborating on the measurement of worldviews, Kahan (2012) highlights the work of Dake (1992), a student of Wildavsky, who developed a type for each quadrant: *hierarchy, egalitarianism, individualism, and fatalism*. However, limited internal validity of individual orientations, did not align with Douglas and Wildavsky assertion that "individuals attend selectively to risk in patterns that reflect and promote the ways of life to which they subscribe" (Kahan 2012, p. 730). Kahan (2012) developed two separate scales, from hierarchy to egalitarianism, seen as high/low grid ways of life, and individualism to communitarianism, as strong/weak group ways of life, and operationalized these as Likert-type items (Figure 3). An individual's worldview is defined by the coordinates between the axis (p. 730). Kahan speaking to the design of the instrument prioritized internal validity and explanatory utility in developing the worldview measurement.

Kahan defines that culture and risk perceptions are intertwined based on the assumptions that a way of life equates to associated risk perceptions, and that risk perception follows way of life. Rachlinski (2021, p. 280) further asserts that "The influence of cultural/political worldview on the evaluation of scientific uncertainty also explains the clustering of political beliefs." Cultural Cognitions' focus on social and psychological mechanisms that explain individuals' beliefs about risk has the practical objective (Kahan 2012, p. 726) "to promote collective management of public perceptions of risk and the effect of policies for mitigating them," which closely relates to environmental management.

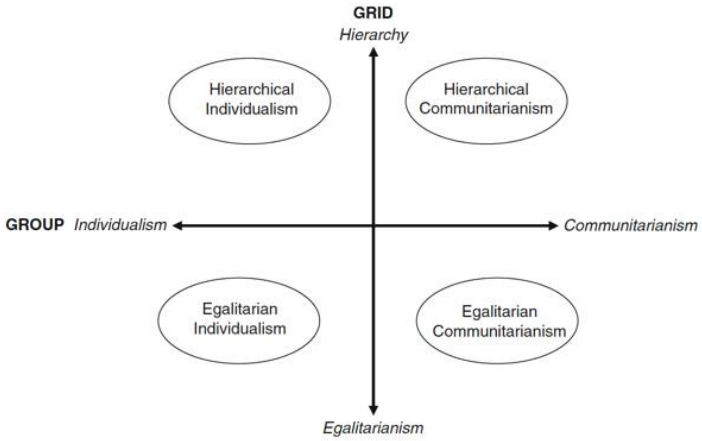

Figure 3 The "ways of life" model (Kahan, 2012, p. 733)

See Appendix D) 3) for comments on cultural worldviews applied to wildfire policy Howe et al. (2024) and sustainable mobility Chuang (2020)

Integrative Worldview Framework

The Integrative Worldview Framework (IWF) developed by Hedlund de-Witt (2012) approaches worldview theory systematically. Hedlund-de Witt (p. 79) notes the need for "measurement of structural worldview-beliefs that accounts for human and cultural development and the cognitive possibility of integration instead of working with a binary framework." The IWF (p. 80) distinguishes aspects of worldviews in terms of ontology (assumptions about the formation of reality), epistemology (the form and source of knowledge), axiology (what defines a good life, morality and quality of life), anthropology (understanding of humans and human purpose), and societal vision (regarding the ideal organization of society and how issues are addressed). The instrument aims to investigate the multiplicity of worldviews and "structural assumption rather than… surface positions and opinions" (p. 81). The framework integrates numerous scales in worldview aspects. Highlights from Hedlund-de Witt (2014) study include that results suggested that environmental attitudes mediate "the influence of worldview-factors on sustainable

behaviors" (p. 47) and that "pro-environmental attitudes appear associated with a more intrinsic-oriented worldview" (p. 51). The model shares similarities to Rousseau (2018) Worldview Inquiry Framework and supports the application of systems theory for meta-theoretical constructs of worldview components.

See Appendix D) 4) for comments on Hedlund-de Witt (2014) study

Environmental Values, Attitudes, and Beliefs

A) The Ecological Worldview Scale and 2-MEV

Following the development of the NEP scale, numerous studies explored the psychological and social factors that constitute an ecological worldview, such as Blaikie (1992) Ecological Worldview Scale and Bogner and Wisemans (2003) 2-MEV (Two-Factor Model of Environmental Values).

Blaikie (1992) investigated levels of commitment to an ecological worldview in an Australian sample of students and community members and developed an environmental worldview scale with seven subscales. The environmental worldview scale, including 24 Likert-type items, applied and adapted items from existing scales such as the NEP (Dunlap and Van Liere, 1978), the DSP Scale (Dunlap and Van Liere, 1984), and from Richmond and Baumgart's (1981) scales, and tested these with factor analysis and varimax rotation to find strong loading on all items (Blaikie 1992, p. 149). The subscales' items included: *Use/abuse of the natural environment, Precariousness of the natural environment, Conservation of the natural environment, Sacrifices for the environment, Confidence in science and technology, Problems of economic growth, and Conservation of natural resources* (p. 150). Blaikie found "preference for technical solutions to environmental problems is relatively independent of views on conservation of the environment and natural resources…However, it is also possible for some people to be both pro-economic development and pro-environment," (155) and

mentions a connection to sustainable development, where both concepts are combined. Blaikie finds minor differences between the student and community samples, national differences between the USA and Australia in the application of NEP items with are ascribed to potential cultural shifts and the growth of environmentalism, and that there is a "curvilinear" (p. 144) relationship of age to the worldview. Blaikie concludes "that the ecological world view scale contains a complex set of views, on a number of disparate dimensions, which may have different antecedents (p. 161). He theorizes that a cohort model and groups' familiarity with social movements underly effects of age on worldview.

Wiseman and Bogner (2003) building on Blaikie (1992) findings aimed to determine higher order factors of environmental attitudes and relate these to Eysenck Personality Traits; Extraversion, Neuroticism, Psychoticism, and associated social desirability criteria "fake-good" (Eysenck, 1981, Eysenck and Eysenck, 1963). Bogner and Wiseman, mention an aim shared by Blaikie to combine items from specific batteries to find a generic one (2003, p. 785). Conducting a survey of secondary school children in Southern Germany, Wiseman and Bogner (2003) applied a sample of environment-related items from Bogner and Wilhelm (1996) together with the Eysenck Personality Questionnaire (Junior). The 2003 study Utilized primary factors extracted by Bogner and Wiseman (1999) from Bogner and Wilhem's (1996) study of a European sample and combines Bogner and Wilhelm's battery with the NEP. The primary factors' scores were subject to secondary factor analysis and revealed the uncorrelated factors labeled *Anthropocentric Utilization* (UT) and *Biocentric Preservation* (PRE), as Blaikie (1992) had mentioned (Bogner and Wiseman, 2003, p. 786). The study found that "PRE and UT are independent dimensions of the structure of human values, ''in the minds'', so to speak, of our respondents" (p. 789). Bogner and Wiseman assert the two-dimensional and higher order factors for a model of ecological worldview, depicted as a

theory of ecological attitudes in Figure 4. Results also showed that Neuroticism is related to Conservation and Psychoticism to Utilization, and that the fake-good, desire to please, category is more present in conservation. Wiseman and Bogner (2003) furthermore, situate the model next to key theories at the time connecting values to behavior. The leading contribution of the paper is the higher-order two factor model of utilization and preservation describing ecological attitudes and advancing literature on values and behavior.

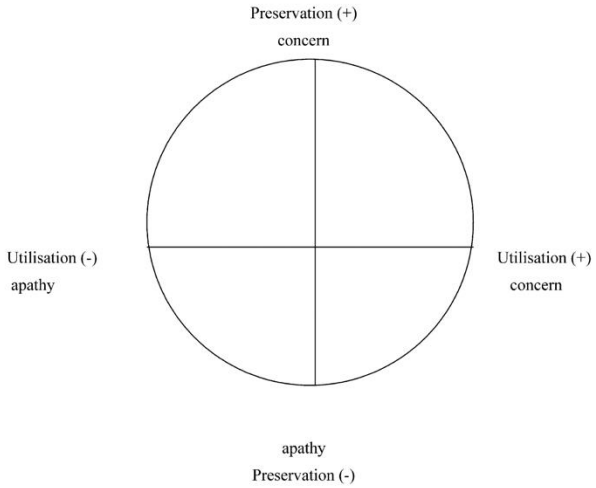

Figure 4 Theory of ecological attitudes (Bogner and Wiseman, 2003, p. 791)

See Appendix 5) for Bogner and Wiseman (2006) further validation of the 2-MEV

B) Value Orientations, the Norm-Activation and Value-Belief Norm Frameworks

Stern and Dietz (1993, p. 323) state that "environmentalism represents a new way of thinking that has not been linked to a social-psychological model," except for Schwartz (1977) Norm Activation Model (NAM). The NAM as described by Stern and Dietz (1993), suggests individuals act pro-environmentally when aware of harmful consequences to others from an environmental situation, and that feeling responsibility and personal moral obligation to remedy a situation prompts action. Stern and Dietz's model of environmental concern builds on Schwartz's Norm-activation theory which defined environmentalism as a form of

altruism. Noting Rokeach (1973) finding that “environmental attitudes can flow from a value orientation that reflects concern for the welfare of other human beings (p. 325), Stern and Dietz (1993) propose that a human welfare-oriented value orientation is one of three orientations that affect environmental attitudes and behavior. Next to a human welfare orientation, coined *social-altruistic* value orientation, Stern and Dietz define an *egoism* orientation, of self-interest, and a *biospheric* orientation prioritizing non-human and general biospheric welfare (p. 326). The expanded model assumes orientations coexist or can individually lead to environmental concern and action. To verify the model, Stern and Dietz (1993) conducted a survey of undergraduate students in northern New York State using Likert-type items including items from the NEP and NAM to measure beliefs about “the consequences of environmental quality or environmental protection" (p. 332) for each of the three orientations, and “willingness to take four kinds of political action for environmental protection” (p. 334). Stern and Dietz found a statically significant regression between the belief scale and behavioral intention that belief in a consequence of a value orientation type, or combined orientations, predicts motivation for political action (p. 336). However, context-dependent attention selectivity may mobilize value orientations. Concluding, Stern and Dietz, find that environmental concern is modulated by different value frames, and perceived effects of environmental issues. Furthermore, the study posits “that socialization and social structure can shape individual environmental concern by affecting value orientations or by altering individuals' attentiveness to information” (p. 340).

See Appendix D) 6) for comments on Stern and Dietz, (1994) value basis of environmental concern and (1995) NEP in socio-psychological context.

Stern and Dietz (1999), as culmination of previous studies (Stern and Dietz 1994, 1995), propose the value belief norm theory (VBN) to describe and investigate

environmentalism and support for social movements. Situating the paper in literature on social movements and building on the notion that movements aim to provide collective goods, the theory supposes that appealing to norms and organizing generates movement support by inspiring perceived obligation (p. 83). Three factors, direct norm-based action: "acceptance of particular personal values, beliefs that things important to those values are under threat, and beliefs that actions initiated by the individual can help alleviate the threat and restore the values" (p. 83). Stern and Dietz' theory aims to address a long-standing critique of Heberlein (1981) of research on environmental attitudes and behavior, in that most work does not build a cumulative understanding of the systematic connection and comparison of theories. Stern and Dietz (1999), in response, incorporate aspects of Schwartz Norm Activation theory, the theory of personal values, and the NEP, into the Value-belief-norm (VBN) theory and compare VBN theory to Douglas and Wildavsky (1982) cultural theory of risk, the theory of post-materialist values (Inglehart, 1977) about the political and social values of a "post-materialist" society, and spiritual and religious worldviews. VBN theory is defined (Stern and Dietz 1999, p. 85) as a causal chain of five variables: "values (especially altruistic values), the NEP, AC (adverse consequences) beliefs, AR (ascription of responsibility to self) beliefs (not measured in the study), and personal norms for pro-environmental action"…where the causal chain "moves from relatively stable, central elements of personality and belief structure to more focused beliefs about human environment relations, the threats they pose to valued objects, and the responsibility for action, finally activating a sense of moral obligation that creates a predisposition to act in support of movement goals." VBN theory was validated by a study applying phone interviews with a battery of items representing the NEP, personal values, the NAM, and elements of Schwartz value basis of environmental concern including altruism vs self-interest and conservation versus openness to change (p. 86). The study found that "personal norms

had strong associations with the behavioral indicators of each type of nonactivist environmentalism (the bivariate correlations of personal norm with consumer behavior, willingness to sacrifice, and environmental citizenship are 0.41, 0.55, and 0.43, respectively) (p. 89)" VBN, compared to other scales is empirically validated as the most advanced predictor of non-activist and public support for environmental movement. Stern and Dietz contextualize findings of the application of VBN theory by clarifying other theories' predictive merits, that socio-economic conditions affect movement support, the differentiation between non-activist and activist support, and that identity and associated framing play an important role in social movements (p. 91). The development of the theory overall clarifies the connection between values, norms, and social movements in an environmental context which affects the social conditions in which worldviews develop.

C) Additional Streams of Environmental Values

Instruments in environmental values literature often develop contextually, and as Wiseman and Bogner (2003, p. 785) state "the study of first-order factors generates as many batteries as investigators." Several examples including Steger et al. (1989) application of worldviews in measuring postindustrial values and Van Riper and Kyle (2014) measurement of worldview's spatial distribution and connection with environmental values, outline the application and synthesis of previously applied scales for new applications.
See Appendix D)7) for comments on the respective studies.

Mental Models and Representations

Mental model and representational approaches share findings with value orientations and apply mostly qualitative methodologies.

Shepardson (2007) studied students' mental models of environment to provide insights for pedagogy. Shepardson (p. 330) citing Greca and Moreira (2000), outlines how mental models are based on "prior knowledge, existing ideas or conceptions, and past experiences" and have a predictive and explanatory functionality. Jones et al (2014, p. 2) while research interview procedures with and without a visual components in situated and non-situated contexts for application in natural resource management defines mental models as "internal cognitive structures that guide people's interactions with the world around them" (Craik, 1943, Johnson-Laird, 1983). Shepardson (2007) builds on a constructivist approach (Schwandt, 1994) where language reveals how students construct context-specific meanings. Shepardson's descriptive and cross-age survey collected qualitative data via writing, drawing, and interview tasks in classrooms across the United States. The data was coded, and statistically analyzed to "to determine the significance in the frequency of the identified student conceptions" (p. 331). Researchers furthermore defined their mental model (Figure 5) to minimize influences on data interpretation. Environment was defined as "composed of natural systems, human systems and processes that interact in a non-linear fashion to create environmental issues, problems, and events" (p. 333).

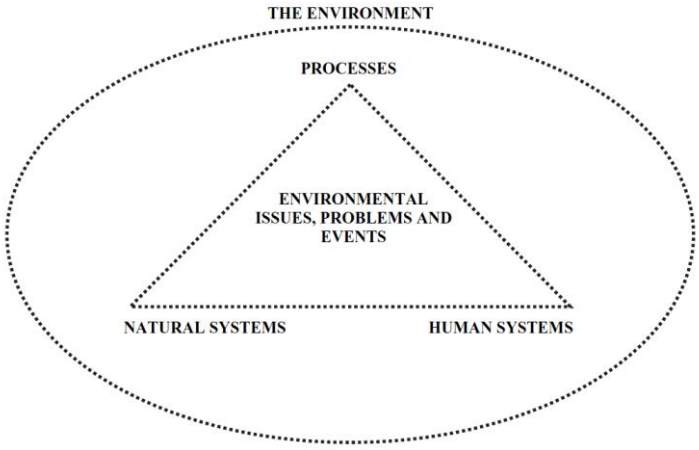

Figure 5 A mental model of environment (Shepardson 2007, p. 332)

The analysis found 32 codes/concepts, 12 categories, and four models. Model one was most popular and separates humans and environment, model two sees environment as a resource to all life, model three highlights effects on environment, and model four, the least popular, defines humans in harmony and as part of environment (p. 336-341). Response types varied by grade level and community settings. The study highlights the role of contextual factors on mental models such as institutionalized conceptualizations of environment, which affect how local environmental issues are framed. Jones et al (2014, p. 6) similarly asserts the importance of location in eliciting mental models, and that locations can be adapted to support research aims. Shepardson concludes that students' models of environment highlight views of environment with societal implications and impresses the need to research how mental models of environment change over time and affect behavior.

See Appendix D) 8) for comments on Buijs (2009) study of images of nature

Hovardas and Stamou (2006) apply social representations theory (SRT) to study rural residents' representations of nature, wildlife, and landscape. SRT in the study is defined as (p. 1750) "the elaborating of a social object by a social group for the purpose of communicating and behaving (Moscovici 1963)" where social objects, are material or symbolic entities (Wagner 1998), and which quoting Wagner (1996), "as far as their structure is concerned, … are regarded as sets of belief-system elements and cognitive elements that serve declarative, instrumental and explanatory functions." The study conducted in-depth interviews with 23 residents of the Dadia Forest Reserve in Greece to identify residents most common views. Analysis was composed of organizing interview replies into topics, belief-system elements, and cognitive elements seen as a continuum. Results categorized: system types: *natural* or *anthropogenic*, depictions: *biophilic* or *biophobic*, metaphors: *balance, balanced flux*,

competition, cooperation, chain, valuations: *resource, lifeworld, arcadia*, Human versus Nature: *nature dominant, parity, stewardship, man dominant* (p. 1754). Depictions were defined as having "emotional weight allocated for systems", and metaphors as revealing "basic functional mechanisms attributed to systems" (p. 1754). The paper found that representations of wildlife and landscape are at times non-dualistic, yet nondualistic and dualistic views of nature also coexist for belief systems bridging rural and urban settings.

Discussion:

In conclusion, this paper defined how environmental worldviews emerge in academic literature next to the 1919 theory of Karl Jaspers. The method included a database search which defined key categories that were presented via synthesized representative papers. The categories of worldview research defined included: Jaspers Psychology of 1919, the NEP scales, Cultural Cognition, the Integrative Worldview Framework, The Ecological World View Scale and 2-MEV models, value orientations and the NAM and VBN frameworks, and mental models and social representations. This review began by clarifying concepts of environment, worldviews, inter-subjectivity and objectivity, and communication and social movement theories. Results included highlighting research areas and the perspectives of environment that emerge therein across quantitative and qualitative methods. The variety of papers and theories outline how environmental worldviews diverge and align in literature.

Limitations of this paper and approach are foremost that the volume of available literature entails that the categories and papers identified are influenced by what is most representative to the reviewer. Incorporating a structured keyword search procedure inspired by the Prisma Scoping Review method addresses this limitation. The broad use of terms in the structured search mitigated the chance of omitting categories, yet the definition of

categories was in part inspired by the pilot search. Categories defined and the papers chosen aim to provide an overview of EVWV research approaches and theory to enable a side-by-side comparison with Jaspers.

A technical limitation is that key theoretical influences may not have been mentioned in titles and abstract, as shown by 32.14% of search results matching defined categories. Despite the precaution of coupling a structured search with snowballing, and discussion with academic experts, the limitations that certain papers may have been omitted persists. Opportunities for further research are developing more extensive systematic and algorithmic database search procedures, and the visual representation of the interrelation and historical development of theories related to EVWV. A systematized review culminating in a concept map as Watson and Webster (2020) proposed would provide valuable visible representation and show the feedback loops and network structure intuited to underly the results of this review. Since the aim of this paper was to identify landmarks of thought, the greater or lesser visibility of literary streams is a feature of the landscape and a result of balancing breadth and depth for the practicality of an overview.

Jaspers' work remains a landmark that methodologically and theoretically provides insights. Jaspers' psychology defines the conceptual space between psychology and philosophy, outlines components and mechanisms of worldviews, explores the nature of ideas and subjective/objective differentiation, and comments on environment as a subset of images in thought. Literature of the last 50 years in the review, explores empirical examples of environmental thought to provide generalizable insights, similarly to Jaspers', that educate further contextual research. The hypothesis that EVWV literature complements and expands

on Jaspers' Psychology of Worldviews, can be strongly asserted, since empirical insights substantiate Jaspers' theory, and elaborate dimensions of environmental thought.

Meta-theoretically, the categories found in modern literature of values, representations, worldviews, and paradigm shifts, fit within Jaspers concepts of orientations (Einstellungen), images (Weltbilder), and emotive states (Das Leben des Geistes). Environmental worldviews were defined under historical, mechanical, and spiritual images, which are categories recurrent in the review. The connections to Jaspers are literal and structural. The NEP describes a change in worldview, and mobilizes components of all of Jaspers' categories, and Cultural Cognition elucidates four quadrants of psycho-social relations that factor into worldviews in terms of orientation and images. Certain scales such as the Ecological Worldview Framework combine measures to provide deeper insight into respondents' views while frameworks such as the Integrative Worldview Framework take a broad meta-theoretical view of the categories that define worldviews, and recruit items and inspiration from numerous scales. Despite researching different environmental contexts with different methods, a review of the literature reveals a circularity, between the factors that constitute a worldview, from broad to specific and subjective to objective, and the worldviews that are represented in theory to measure particular factors.

Scales such as the NEP which define one worldview from another, are applied extensively to elucidate the specifics of emergent worldviews and the dimensionality of factors therein, as is shown in quantitative methods applying primary and secondary factor analysis. The broad framing of worldviews and key dimensionality present in respondents thought, oftentimes statistically validated, provide a departure point for future verification and elaboration. Qualitative literature reveals the myriad factors present in environmental

thought, which when coded and synthesized lead back to a contrast of key dimensions as defined in the NEP or other higher-order factor studies such as Wiseman and Bogner (2003). There is a balance to find in research of broad overarching categories such as Hedlund-de Witt's IWF, which is applicable to worldviews overall, yet requires contextualization, and context specific instruments which benefit from synthesis and comparison, as highlighted by Heberlein (1981). The need to understand how values and worldviews translate to behavior was mentioned by Dunlap (2000), and Wiseman and Bogner (2003) elaborated that the external validity of behavioral intent and actual behavior was a research need. Stern and Dietz (1993, 1994, 1995) progressively highlight the importance of social structures on behavior and subsequently developed the Value-belief-norm theory of social movements (Stern and Dietz, 1999). The progression of research from defining components that make up worldviews, such as values and representations, and repeated emphasis on contextual factors that shape behaviour and perception, such as risk (Douglas and Wildavsky 1982), precedes movement into theory on social movements (Stern and Dietz 1999). Intuitively movement in the arc of EVWV literature moves from broad theory to specific applications, which provides contextual insights which are synthesized back to theory, often involving new domains, repeating the cycle. Worldview literature is a feedback loop of two primary dimensions, the subjective to objective, as was defined in analysis of worldviews, and local to general, as defined in conceptualization of environment. Worldviews and environment are in a recursive relationship that develops social knowledge and elaborates the theories that guide research. Similarly, as Gergen (1973) outlines, introducing theory into society affects social conditions, making socio-psychological insight, a recounting of a time, which iteratively contributes to the definition of subject object relations and provides a systematic basis for future research.

Bauer and Sammut (2021, p. 228) Cyclone Model of Social Influence (Figure 8), identified as "common sense and joint intentionality of a collective on the move in time and space," charts movement between normalization, accommodation, and assimilation, and nicely describes how ideas of environment and worldview, in academic literature, and/or in common-sense develop. Each environmental context, defined by the interrelation of inter-subjective and inter-objective representations defined by worldview, evolve over time and interrelate. Bauer and Gaskell's (1999, 2008 p. 343) Toblerone model of social representations outlines a representation as a structure of subject, object, and project, that moves throughout time, and where subjects interact to communicate and define an object. The subject or individual (applying Jaspers' framework) contributes value orientations, images, and emotive states while creating a representation. As a subject interacts with another to define an object, representations and worldviews interact to become social representations, recursively influencing each subject. Representations can coexist, in individuals, as cognitive polyphasia, defined as "the coexistence of rationalities derived from knowledge systems, and that these ways of knowing are recruited to address 'particular circumstances' and 'particular interests'" (Jovchelovitch, 2002, p. 3). Socially, representations overlap and interact and can combine and interlock to form a movement, as Bauer and Gaskell (2008, p. 346) outline in the Windrose Model of Social Representations (Figure 7).

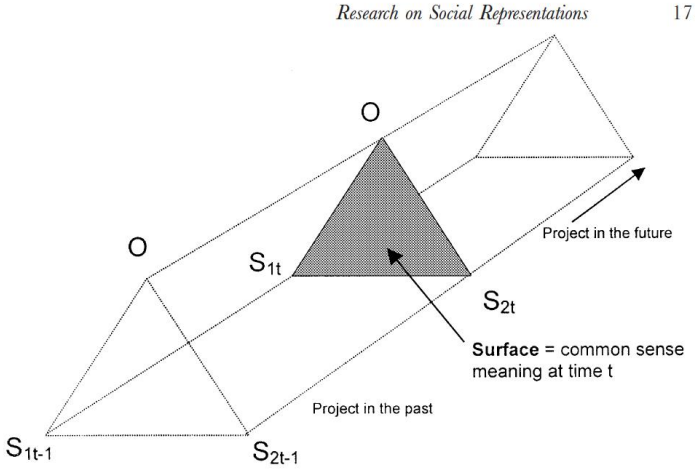

Figure 6 The Toblerone Model of Common Sense (Bauer and Gaskell, 1999, p. 171)

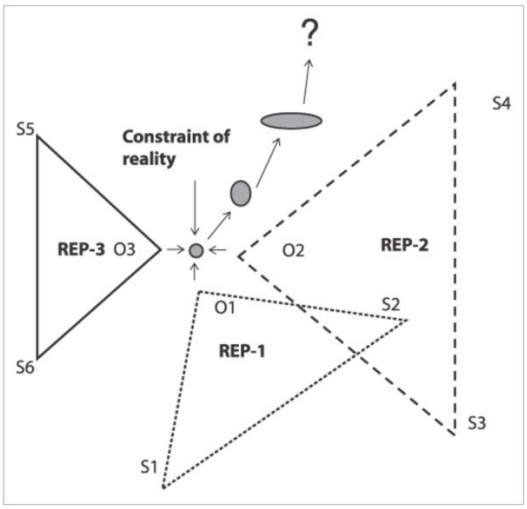

Figure 7 The Windrose Model of Social Representations (Bauer and Gaskell, 2008, p. 346)

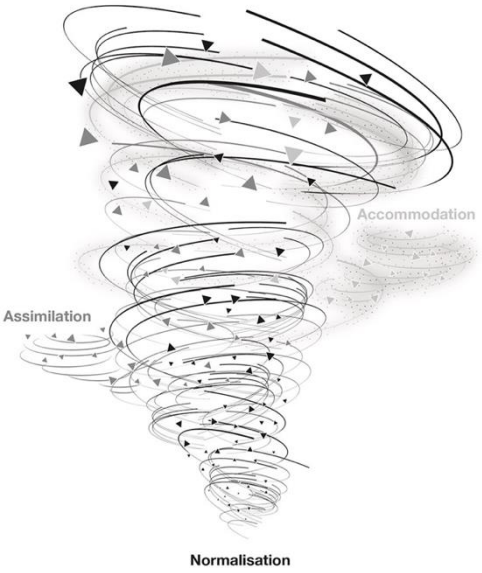

Figure 8 The Cyclone Model of Social Influence (Sammut and Bauer, 2021, p. 228)

In theory, a project of a single representation, a Toblerone (Figure 6), can be extended to a Windrose of multiple projects as Bauer and Gaskell (2008, p. 345) assert, which can then be nested in The Cyclone Model of Social Influence, where representations gain social traction and come to define how individuals interact with the environment and one another. As Bauer and Gaskell (2008, p. 344) outline in reworking the Toblerone model, a representation is a function of "subject, object, project, time, medium, intergroup context." Subjects' worldviews, expressed in choices, *Grenz-situationen*, in Jaspers words, become

visible in communication and action and thereby extend to the social construction and cultural construction (Franks 2014) of representations and worldviews in a given time, contributing in sum to Zeitgeist. This effect can also work in reverse with Zeitgeist affecting worldviews and social representations. While a representation is not a worldview, I propose that representations are created by and accompanied by worldviews. Sammut and Bauer (2021, p. 84) mention, "Social representations are socially shared mindsets akin to 'world-views' linked to competing social-milieus." Yet worldviews, as defined by Jaspers, have depth and breadth beyond individual or social representations. Both types of representations contribute to worldviews and worldviews influence representations' formation. Worldviews, therefore, act on and interact on each level of a chain of representations, in destructive or constructive interference, to the point of social influence and shifting common sense. Representations and worldviews mobilized in group contexts can have a heightened influence by affecting the representational projects and how individuals and groups rework, discard, or strengthen their worldviews, as substantiated by Bauer and Gaskells' addition of intergroup context to the Toblerone model. Reviewed literature consistently impresses the importance of social contexts in defining how views of environment are developed and engaged with. This has direct implications for science communication and studies of public opinion. Representational threads from individual to social, accompanied by Jaspers' worldview theory, help define how we see the world and how changes in worldview and representations change how we interact with and conceptualize the world around us. A promising area for future inquiry is the connection between worldviews and interlinked theories of social representations, and social influence. As environmental threats such as wildfires increase and environments change, it is critical to research how environmental worldviews and associated social movements shape our collective understanding and communication.

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Appendices

Appendix A: Select Translations

According to Footnotes in Introduction and Literature Review

Footnote 4) *"Es ist philosophische Aufgabe gewesen, eine Weltanschauung zu gleich als wissenschaftliche Erkenntniss und als Lebenslehre zu entwickeln. Die rationale Einsich sollte der Halt sein. Statt dessen wird in diesem Buch der Versuch gemacht, nur zu verstehen, welche letzten Positionen die Seele einnimmt, welche Kräfte sie bewegt."* Jaspers (1925, p. Vorwort zur Ersten Auflage)

Footnote 5) "*Im Kampf der wissenschaftlichen Anschauungen und der lebendigen Persönlichkeiten spielte nicht einfach das empirisch und logisch für jedermann gleichermaßen Richtige eine Rolle. […] In der Diskussion war fast immer auch etwas anderes fühlbar. Nicht etwa unser Geltungsbedürfnis, unser Rechthabenwollen war dabei interessant, sondern irgendein Etwas, das nicht faßbar war, obgleich es Schranken zwischen den Menschen aufzurichten schien" Jaspers (2019,* Einleitung des Herausgebers, p. XXXVIII)

Footnote 9) "*Mit Schleiermacher und Goethe setzte schließlich eine subjektivierende, lebensgeschichtliche Auslegung des Begriffs ein, nach der die Weltanschauung als Ergebnis eines persönlichen Bildungsprozesses anzusehen ist, durch den das Subjekt seine Lebenswelt kognitiv konstituiert. Jaspers (2019, p. X) quoting H. Thomä: »Weltanschauung«, in: Historisches Wörterbuch der Philosophie, Bd. 12, 453–454.*

Footnote 10) "*Die Auseinandersetzung mit der Weltanschuungesfrage erscheint vor diesem Hintergrund als Symptom einer zutiefst verunsicherten Zeit, dessen Signatur, die individuelle Halt- und Sinnsuche, in Jaspers' Werk nicht nur durch die Aufnahme der*

Weltanschuungesthematic Eingang gefunden hat, sondern aauch in seinen philosophischen Impulsen und Wersetzungen zum Ausdruck kommt." Jaspers (2019, p. XIV)

Footnote 11) "*Von Weltanschauungspsychologie kann nur die Rede sein in Zeiten der Individualisierung. Für gebundene Zeiten, in denen eine Weltanschauung als selbstverständlich für alle die gleiche ist, kann es nur eine Sozialpsychologie der Weltanschauung geben"* Jaspers (2019, p. 55)

Appendix B: Search Protocol

Title and Abstract Search Terms:

(environ* OR natur* OR eco OR ecol* OR bio* OR sustainab*)

AND

(worldview* OR world-view* OR world view* OR value* OR attitude* OR belief* OR norm* OR ethic* OR discourse* OR imaginar* OR representation* OR perception* OR philosoph* OR paradigm* OR mindset* OR mental* OR symbol* OR moral* OR axio* OR ideolog* OR epistemolog* OR teleolog* OR theolog* OR ontolog* OR cosmo*)

AND

(classification* OR frame* OR typolog* OR type* OR hierarch* OR system* OR taxonom* OR scale* OR heuristic* OR orientation* OR paradigm* OR struct* OR model* OR measure* OR instrument* OR map*)

Appendix C: Elaborated Table of Selected Papers

Title	Author, Year	Measures and Method Highlights	Worldview Type	Source
New Environmental Paradigm, New Ecological Paradigm Database Search Appearances: 80				
The "New Environmental Paradigm"	Riley E. Dunlap & Kent D. Van Liere 1978, reprinted (2008)	1 axis: DSP vs NEP Likert type survey questions, 12 Item Scale Inspired by Pirage and Ehrlich's (1974) Ark II, Kuhn (1970) Structure of Scientific Revolutions, Aldo Leopold Land Ethic, Rachel Carson Silent Spring	Defines two worldviews	Pilot

		Quantitative		
Measuring endorsement of the new ecological paradigm: A revised NEP scale	Dunlap and Van Liere, et al. (2000)	15 Item Scale (Added 3 measures to incorporate sociopsychological theory inspired by Rokeach (1968) Quantitative		Search
The New Environmental Paradigm Scale: From Marginality to Worldwide Use	Dunlap (2008)	Reflection on development and reception		Pilot
Cultural Cognition Group Grid Database Search Appearances: None identifiable				
Cultural Cognition as a Conception of the Cultural Theory of Risk	Kahan (2012)	Grid/Group operationalization into 2-dimensional model from Douglas and Wildavsky (1982) Quantitative	Subset of WV	Snowball
The role of worldviews in the governance of sustainable mobility.	Chuang (2020)	Three items from cultural cognition applied with attitudes survey Quantitative	Contextualizing subset of WV	Pilot
Worldviews more than experience predict Californians' support for wildfire risk mitigation policies	Howe et al (2024)	1 axis group applied 17 questions six-level Likert Scale derived from Kahan (2012) Quantitative	Subset of WV applied	Pilot
Integrative Worldview Framework (IWF) Database Search Appearances: None identifiable				
Hedlund-de Witt, A. (2012). Exploring worldviews and their relationships to sustainable lifestyles: Towards a new conceptual and methodological approach.	Hedlund-de-Witt et al. (2012)	Theoretical	Metatheory of WV	Snowball
Exploring inner and outer worlds: A quantitative study of worldviews, environmental attitudes, and sustainable lifestyles.	Hedlund-de Witt, A., de Boer, J., & Boersema, J. J. (2014).	NEP (Dunlap 2000), intrinsic versus instrumental values of nature (Thompson & Barton, 1994) Self-transcendence versus self enhancement (Schwartz & Bilsky, 1987), further measures and theory related to connection to nature, values, and religion	Operationalized	Pilot

		Quantitative		
Environmental Values, Attitudes, and Beliefs				
Environmental Worldview Scale and 2-MEV (2 Factor Model of Environmental Values) Database Search Appearances: 8				
A higher-order model of ecological values and its relationship to personality	Wiseman and Bogner (2003)	Bogner and Wilhem (1996) Items Eysenck Personality Types Quantitative	Subset and psychological context of WV	
Adolescents' attitudes towards nature and environment: Quantifying the 2-MEV model	Bogner and Wiseman (2006)	2 Factors Utilization and Preservation 5-point Likert scale 31 (ENV +NEP) items from the first-order batteries, NEP extended by 14 items from Bogner and Wilhelm (1996) Inspiration: Rokeach (1968, 1973), Milfont, and Duckitt (2004) Quantitative	Subset of WV	Search
Ecological Worldview Scale	Blaikie (1992)	24 Items Factor analysis and varimax rotation, strong loading on all items Environmental Worldview Scale and 7 Subscales 5 Item Likert Scale 6 Items NEP (Dunlap 1978) 6 Items DSP (Dunlap 1984) 8 Items Richmond and Baumgart Scales Quantitative	Measuring for WV	Search
Norm Activation Model (NAM) and Value-Belief Norm Theory (VBN) Database Search Appearances: 29				
Value orientations, gender, and environmental concern	Stern and Dietz (1993)	Schwartz (1977) Quantitative	Subset Of WV	Search
The value basis of environmental concern.	Stern, P. C., & Dietz, T. (1994).	Quantitative	Subset of WV	Snowball
The new ecological paradigm in social-psychological context	Stern, Dietz, and Guagnano (1995)	Dunlap and Van Liere (1978) Quantitative	Worldview contextualized	Search
A value-belief-norm theory of support for social movements: The case of environmentalism.	Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., &	Incorporates Schwartz (1977)	WV extended to social movement theory	Snowball

	Kalof, L. (1999).	Quantitative		
Value Orientations Database Search Appearances: 42				
Political culture, postmaterial values, and the new environmental paradigm: A comparative analysis of Canada and the United States	Steger et al. (1989)	Mail survey incorporating items to measure Measure of postmaterial values Ingelhart (1971, 1977): choose 2 of 4 national goals Support for the NEP, six of the twelve items from Dunlap and Van Liere (1978, 1984) Cross-national differences explored. 8 political orientations 3 measures - level of risk (Douglas and Wildavsky 1982) associated with acid rain Quantitative	Elaborating WV	Search
Using analyses of public value orientations, attitudes and preferences to inform national forest planning in Colorado and Wyoming.	Van Riper and Kyle (2014)	Quantitative	Subset of WV	Pilot
Measurement of Environmental Concern: A Review and Analysis.	Cruz, S. M., & Manata, B. (2020).	Reference		
A scoping review of nature, land, and environmental connectedness and relatedness.	Keaulana et al (2021)	Reference		
Cultural worldviews and environmental risk perceptions: A meta-analysis.	Xue et al (2014)	Reference		
Why nature matters: A systematic review of intrinsic, instrumental, and relational values	Himes et al. (2024)	Reference		
Mental Models Database Search Appearances: 36				
Students' mental models of the environment	Shepardson (2007)	Writing drawing and interview task Coded, and codes categorized and grouped into typologies, statistically analysed to define mental models	Subset of WV	Search

		Mixed methods		
Eliciting Mental Models: a Comparison of Interview Procedures in the Context of Natural Resource Management	Jones et al (2014)	Developing methods to research mental models (Craik 1943, Johnson-Laird 1983). Mixed methods	Methodological	Search
Representations Database Search Appearances: 22				
Lay People's Images of Nature: Comprehensive Frameworks of Values, Beliefs, and Value Orientations	Buijs (2009)	Hybrid Theory Mixed methods	Subset of WV	Search
Structural and narrative reconstruction of rural residents' representations of 'nature', 'wildlife', and 'landscape'	Hovardas, T., & Stamou, G. P. (2006).	Social Representations Theory Qualitative	Subset of WV	Search

Appendix D Extended Commentary on Included Texts

1) Jaspers' "Der Lebendige Prozess" [The Living Process]

Under the purview of emotive states, Jaspers also outlines Der Lebendige Prozess [The Living Process] of worldview change. When one becomes aware of one's worldview and begins to question the possibility of other worldviews and ways of life, worldviews begin to change. "The conscious experience of a border-situation, which was previously fixed and obscured in the structure of experience of objective self-evident Lifeforms, World-images, and imaginings, triggers a process where previous self-evident structures begin to dissolve via movement into limitless dialectical reflection" (p. 281). In an iterative reflective process, worldviews are formed, destroyed, and reformed, as assemblages, and as metamorphosis. "Without dissolution there would be freezing, without structure, destruction" (p. 283). Jaspers (p. 282-283) proposes that dissolution and construction are part of the same process of sense and meaning-making. "The motive is to find stability instead of never-ending movement, and objective justification from rationality as opposed to complete responsibility for living powers and their choices" (p. 283). Persons seek to experience, develop, create, and strive toward the unknown, and to make sense, structure, and define.

2) Comments on Dunlap's Inspiration for the NEP Scale

Dunlap (2008b) reflects that Pirages and Ehrlich (1974) concept that the survival of societies "is threatened when its DSP no longer offers valid guidance for survival... in the environment of the future" (p. 47) and Thomas Kuhn (1970) notion of scientific paradigm shifts were prominent ideas at the time that prompted further exploration of social paradigm shifts. Changes in personal worldview (2008b, p.6) due to events such as the 1973-74 energy crisis, literature including Donella Meadows' (1972) *Limits to Growth*, and the influence of preservationist perspectives such as those of John Muir (1911) and Aldo Leopold's (1966) call for a land ethic inspired Dunlap's environmental focus. Local environmental debate and the first Earth Day celebrations further contributed to prompt Dunlap's research of the emerging environmental worldview.

3) Cultural Cognition in Practice

Howe et. al. (2024), apply worldview measurement via cultural cognition coupled with survey items on wildfire experience, to measure support for wildfire policy items in California. Cultural cognition was limited to the group dimension, measured via a subset of Kahan (2012) Likert items, and converted into a summed scale. Policy items were converted into a binary of support, to enable regression modelling. Policy support was ultimately modelled as a "function of experience, cultural cognition, and their interaction" (p. 5). Howe reflected that cultural cognition and worldviews provides insight into the formation of risk perceptions that direct ways of life and predict support for policy items.

Chuang (2020) applies Cultural Cognition to measure support for sustainable mobility governance. Items were identified in the British Social Attitudes (BSA) survey of 2016 that

identified egalitarian, hierarchical, or individualist types. Further items matching attitudes to sustainable mobility were found, and the Pearsons correlations to worldviews were statistically evaluated. For the scope of Chuang's (2020) application, individual political and cultural biases were seen as equitable to British worldviews. Reflecting on the application of worldviews in the study Chuang (2020, p. 4040) states that "Worldviews embody our awareness of the social and natural world, which in turn, reflects how we define good quality of life and link our present to the future that we envision. We have demonstrated that worldviews in fact transcend the boundary between human and physical nature and have the potential to map across social attitudes to sustainable mobility." Cultural Cognition facilitates investigating socio-cultural beliefs and environmental policy support.

4) The IWF applied to measure sustainable lifestyles

Hedlund-de Witt (2014) operationalizes the IWF to analyze the interrelation of worldviews, environmental attitudes, and sustainable lifestyles (p. 43). The study combines Likert-type items from the NEP (Dunlap 2000), intrinsic versus instrumental values of nature (Thompson & Barton, 1994), and Schwartz self-transcendence versus self enhancement (Schwartz & Bilsky, 1987), and further measures and theory related to connection to nature, values, and religion. Statements were included as logical opposites and informed by cultural-historical background on worldviews and environmental thought, and notions of intrinsic vs extrinsic motivation from Self Determination Theory. After conducting the study online in the Netherlands, items describing worldviews and environmental attitudes were analyzed with principal component analysis and rotated obliquely, finding five distinct worldview factors and three environmental factors (Hedlund-de Witt 2014, p. 44) The worldview facets were named, inner growth, contemporary spirituality, traditional god, focus on money, and secular nonmaterialism, and explained 46% of total variance (22.1% by factor one). The first

three and latter two worldviews correlated and first versus second sets negatively correlated (p.46). Environmental factors of connectedness with nature, willingness to change, and instrumentalism, emerged and explained 44.4% of variance (28.7 by the first factor). The study furthermore provided general insight on Dutch societal worldviews.

5) Stern and Dietz (1994 & 1995) Studies en-route to VBN Theory

Stern and Dietz (1994) substantiates the value basis of environmental concern and situate the NEP in a socio-psychological context (Stern et al.) in 1995. The 1994 paper validates the three distinctions of egoism, social-altruistic, and biospheric value orientation, finds intercorrelation between them, and further defines a value-belief-behavioral intention relationship. The paper empirically validates the connection between environmentalism and basic human values (Stern and Dietz 1994, p. 78) and identifies the ideological struggle regarding if nature should be valued in itself, or because of benefits provided to humans. The study furthermore highlights that environmental concern is affected by socio-structural factors affecting values, broad-beliefs, and thereby worldviews, and that the theoretical method demonstrated can help anticipate how individuals, due to their values, awareness, and trust in information, interpret information about social and environmental conditions.

The 1995 paper substantiates the effect of social-structure and values on perception of environmental conditions and extends this to behavioral intention. Early experiences are noted as influencing values, general beliefs and worldviews, and social structure provides "opportunities and constraints that shape behavior and the perceived response to behavior" (p. 726). Furthermore, the authors define a that values and worldviews are priors to beliefs that precede "held norms, intentions, and other proximate causes of particular actions" (p. 726). The survey contained items measuring environmental beliefs via the consequences of

environmental damage and change, personally, to others, or to the biosphere. Seven NEP items, and measure of value orientations containing 34 item reflecting Stern and Dietz's (1993) biocentrism and Schwartz (1992) universals in values, and resulting value clusters of *openness to change, self-enhancement, conservation, and self-transcendence* were included. Factor analysis showed four orientations, *biospheric-altruism*, *egotism, openness to change* from Schwartz, and *conservation,* named *traditional values* (p. 732). The study concludes by confirming the validity of the NEP in measuring an ecological worldview, and that beliefs are linked with awareness of consequences of environmental issues. Stern and Dietz (1995, p. 740) assert the importance of understanding how values and worldview - the general, affect how specific information is perceived, and how specific information affects general and public opinion. The updated model broadens the study of environmental attitudes and behavior and asserts the relation of worldviews to communication and social movements.

6) Further Validation of the 2-MEV

Wiseman and Bogner's (2003), higher order two-factor structure of environmental attitudes forming a generic model, (substantiated by Milfont and Duckitt, 2004), guided Bogner and Wiseman's (2006) study to quantify the MEV and again research adolescents' attitudes to nature and environment in Southern Germany. The new analysis included 31 (ENV +NEP) items and combined first-order batteries and 14 new items from Bogner and Wilhelm (1996) study. Results were verified via factor analysis and varimax rotation, sought an orthogonal simple structure, and substantiated the Utilization versus Preservation structure "with the two factors accounting for 38.5% of the total variance: Utilization (U) for 20.5%, Preservation for 17.9%." (p. 250). The study quantified types of environmental awareness, validated dimensions of an environmental worldview, and highlighted the need for improved

measures of external validity since models while predicting behavioral intent are rarely found to validate actual behavior.

7) Value Orientations and Worldviews Combined in Practice

Steger et. al. (1989) explore how postindustrial values and the NEP relate via a comparative analysis of Canada and the United States. Postmaterialist and NEP values are said to reflect the change in politics associated with the relative affluence and security following WWII. The study conducted a mail survey incorporating items to measure postmaterial values where one chooses two of four national goals (Ingelhart, 1971, 1977), support for the NEP, (Dunlap and Van Liere 1978, 1984), and by measuring eight political orientations and three measures on level of risk perception of acid rain deposition (Douglas and Wildavsky (1982). The study (1989, p. 248) found that "postmaterial values and environmentalism are separate constructs in the thinking of both the Canadians and Americans surveyed" and that Canada's more collectivist versus Americas individualist political culture is more closely aligned with the NEP. Steger et al. assert the importance of socio-cultural and political contexts that shape public perceptions of environmental issues and associated socio-economic movements.

Van Riper and Kyle (2014) conducted a study of how values of ecosystem services are shaped by worldviews, combined with spatial analysis and surveys on California's Santa Cruz Islands. The survey includes items from the NEP (Dunlap et al. 2000) and a modified version of Brown and Reed (2000) where respondents attribute points across 12 tangible and intangible value categories. The study reasserted the two dimensions of the NEP, anthropocentrism and biocentrism by defining Neutral and Strong NEP subgroups, 36.4% and 63.6% respectively, where neutral entailed an anthropocentric and biocentric balance,

and strong was weighted toward biocentrism (p. 379). Respondents allocated values across the island spatially and with different weights depending on worldview. The value typology applied comes from forest-planning literature and was developed by Brown and Reed (2000) who applied values defined by Rolston and Coufal (1991). Rolston and Coufal (1991, p. 38) values included ten categories that "integrate human and biotic values and emphasize realms that multiple use often neglects: "*Life support Values… Economic Values… Scientific Values… Recreational Values… Esthetic Values.. Wildlife Values… Biotic Diversity Values… Natural History Values… Spiritual Values…. Intrinsic Values."* Brown and Reed (2000) mention the statistical justification of four value categories derived from Rolston and Coufal by Bengston and Xu (1995). These include *economic/utilitarian, life support, esthetic* and *moral/spiritual*, and the differentiation of instrumental-usefulness versus noninstrumental-worth as an end in itself. Brown and Reed situate Bengston and Xu's differentiation of values and objects of value within Rokeach (1968) distinction between instrumental and terminal values being means and ends respectively. Brown and Reed, operationalized Rolston and Coufal (1991) typology which inspired Van Ripper and Kyle (2014) application beyond the context of forest values. The development of instruments and conceptualizations of value across contexts and the parallel application of worldviews highlights the balance between context specific instruments and generalized theory.

8) Images of Nature (Approaching Values & Beliefs Qualitatively)

Images of nature defined by Buijs (2009) are the combination of values and beliefs that define value orientations which affect perceptions and attitudes. Buijs conducted a qualitative study, interviewing 59 members the public in the Netherlands. The semi-structured interview procedure included two phases, asking general questions about nature and respondents' interaction therewith, and asking questions about nature restoration in the

localized context of villages near floodplains. Interview responses were coded to draw links to theoretical concepts of values, beliefs, and value orientations, before both studies were coded for "ideal types" a sociological concept (Weber, 1904, 1973) "based on empirical observations about the dominant characteristics of social phenomena" (p. 421-422). Five ideal type images of nature were found including wilderness, autonomy, inclusive, aesthetic, and functional. Buijs highlights the need to further explore the allocation of value to nature as intrinsic (individual living beings) or holistic (systems). By defining ideal types, and images of nature, the study sought to unify concepts of values, beliefs and value orientations.