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Imagining Ecocentric Futures Through Media: Toward Degrowth and Non-Anthropocentric Societies—A Proposal for a Biocentric Media Evaluation Questionnaire

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Abstract

Media shape and reflect social imaginaries, influencing collective beliefs, norms and aspirations. Video games and films frequently depict themes like urbanization, dystopian futures, and resource-driven expansion, often envisioning humanity colonizing new planets after depleting Earth's resources. Such narratives risk reinforcing exploitative attitudes toward the environment, extending them to new frontiers. Research has shown that media, especially video games, influence societal perceptions and shape future possibilities. While largely reflecting anthropocentric worldviews, these media also have the potential to promote ecocentric perspectives. In the context of biodiversity loss and planetary imbalance, media's role in fostering non-anthropocentric values is crucial. This study introduces the Biocentric Media Evaluation Questionnaire (BMEQ), a tool designed to help media producers assess whether their work aligns with ecocentric principles, and to support academic researchers and students in the study and analysis of media from a biocentric perspective. Applying this framework to 138 widely distributed video games and films reveals a strong dominance of anthropocentric narratives. While some works incorporate ecocentric themes, they remain inconsistent. The findings underscore the need for a more deliberate and coherent representation of biocentric values in media, advocating for a shift in cultural narratives toward perspectives that recognize and respect the intrinsic value of the non-human world.

Keywords: deep ecology; video games; movies; media communication; non-anthropocentrism; social imaginary; biocentrism; overpopulation; sustainable population decline; BMEQ; biocentric imagination; non-human relationality; post-humanism; degrowth theory

1. Anthropocentrism as the Dominant Social Paradigm

1.1. Reframing the Systemic Narrative

Traditional human-centered narratives and social imaginaries have been used as a primary framework for understanding the world and guiding our collective actions. However, these narratives often have harmful consequences for the environment, as they prioritize human interests over other living beings and the natural world (Ivakhiv, 2013). Drawing on Arne Naess's biocentric philosophy, which emphasizes the intrinsic worth of all living beings regardless of their utility to humans (Naess A. , 2009), his work proposes a shift toward reimagining cultural narratives, expectations, and shared imaginaries. Rather than maintaining a hierarchical worldview with humans at the center, a biocentric orientation encourages the development of stories and symbolic systems that reflect an ethic of coexistence with the more-than-human world. This transformation is particularly urgent considering the ecological limitations of dominant anthropocentric paradigms, which have persisted for over three millennia. By incorporating biocentric and ecocentric values into

cultural expressions such as films, animated works, video games, and social media; powerful vectors of imagination in contemporary society, it becomes possible to reconfigure collective worldviews toward more sustainable futures (Smith & Johnson, 2022) (Lee & Kumar, 2023). This approach is based on the recognition of the inherent value of all living and non-living components, paving the way for a more inclusive and sustainable global narrative.

1.2. Man as the Enduring Measure of the World

In the 5th century BCE, the Sophist thinker Protagoras articulated the principle that "man is the measure of all things." This foundational assertion situates humans as the central criterion for evaluating the paradigm in which they exist. According to this perspective, morals and laws are understood as human constructs, emphasizing that the creation of values and norms is inherently anthropocentric. Such values, under this framework, are seen as contingent on human society, with no existence independent of human interpretation and interaction (Guthrie, 1969) (Kerferd, 1981). If polytheistic religions were sometimes more integrative, monotheistic cults reinforced an anthropocentric vision by giving humanity a central role (Taylor B. , 2016) (Nasr, 1968). The Renaissance period brought to the fore the anthropocentric idea of humans creating meaning and progress, thus moving away from the theological framework in favor of human reason (Hankins, 2007). John McNeill shows how in the modern era the development of science, technology and the industrial age reinforced the idea that nature was present for the sole benefit of its exploitation by humanity (McNeill, 2001). In recent years, ecological concerns have prompted a gradual shift from anthropocentric paradigms toward more ecosystemic and biocentric perspectives. This emerging reevaluation challenges human-centered principles by advocating for approaches that emphasize the intrinsic value and interconnectedness of all living systems (De Lucia, 2013) (Grear, 2017) (Naess A. , 1973) (Tallacchini, 1996). However, this Biocentric awareness is struggling to take hold, even in the face of evidence of the correlation between anthropocentric activity and the destruction of biodiversity. Recent scientific findings leave little doubt about the strong link between human-driven activities and the accelerating decline of biodiversity. A large-scale meta-analysis encompassing more than 2,000 studies and close to 100,000 sites worldwide has demonstrated that pressures such as land-use change, overexploitation of natural resources, pollution, invasive species, and climate disruption contribute to an average loss of nearly 20 percent in species richness in impacted areas (Keck, 2025). Numerous studies carried out during and after the confinement of the COVID-19 pandemic have shown, for example, that during confinement the levels of nitrogen dioxide (NO2) and carbon dioxide (CO2) fell significantly, by 45 at 54%, in the atmosphere, due to the cessation of the exploitation of fossil fuels for cars and industries (Le Quéré, 2020) (Zeng N. e., 2020) (Liu, 2020). Due to the interruption of construction activities, emissions of fine particles PM2.5 and PM10 decreased by 31 to 43%. SPMs were also reduced by 15.9%, leading to a notable improvement in ocean water quality (Lam, 2022) (Liu, 2020) (Zeng Y. &., 2021). In many cities, noise pollution has also decreased by 60 dB (Sordello, 2020) (Forum., 2020). On the banks of certain rivers, where all human activities had ceased, a new life rich in biodiversity was observed. All over the world, an increase in the activity of insects, butterflies, bees, wild and urban animals have been observed during confinement (Bates, 2021) (Owens, 2021) (Woodley, 2021). Thus, for the first time, a global correlation was highlighted between the end of human activities and the rebirth of ecosystems. Recent research from the EEE field has also begun to address how technological systems and media interfaces can be redesigned to promote ecocentric values (Chen & Patel, 2024) (Rodriguez & Nguyen, 2022), further supporting the call for a paradigm shift in our collective imaginaries (Lee & Kumar, 2023).

1.3. Anthropocentrism in Historical Perspective: Growth, Exploitation, and Crisis

Research on mitochondrial DNA has shown that for nearly 100,000 years, while humans were nomads, the population did not exceed 10 million individuals (Cochran, 2009). It seems that tribal nomadism, like the movements of groups of numerous animals, quadrupeds, birds, marine mammals, insects, has allowed human beings to live together for more than 100,000 years in a

tenuous balance with the rest of biodiversity. Paleolithic hunter-gatherers did not seem anthropocentric and probably considered other species as their equal, like certain nomadic populations still present at the beginning of the 19th century (Hayden B. V., 2011) (Hill, 2011). The Neolithic period beginning in - 8,000 BC will have lastingly modified human society by introducing agriculture, sedentarism develops the notion of property and promotes awareness of hereditary transmission requiring descendants (Galor O. &., 2002). Wars are no longer clashes between tribes, but battles between nations, and the need to create powerful armies generate a pronatalist policy which often persists today. Humans who seemed naturally attentive to their ecosystem, particularly through shamanic rituals, are gradually detaching themselves from a wild nature that frightens them in order to constrain and control it (Rowthorn, 2010) (Zeder, 2008).

Historical records indicate that the world's population was approximately 188 million in 1 CE, and it grew slowly until it reached a volume of 990 million people in 1800 at the dawn of industrialization (Mc Evedy, 1978). In fact, the population growth was only 990 million individuals in 1800 years and 7.10 billion in just 225 years, reaching with the phenomenon known as "demographic transition" currently 8 billion individuals (Canning, 2011) (Galor O. , 2005). The massive use of the principles of vaccination, antibiotics, hygiene and food diversification have allowed humanity to prosper exponentially over the last two centuries (Mc Kinsey Global Institute., 2020) (Macquarie University, 2018). Nothing in the dizzying curve of the growth curve of humanity, neither wars, nor even major epidemics like the plague or the Spanish flu, nor Covid-19 have started the demographic growth of the human species (Norrman, 2023). Indeed, even pandemics are only difficult to observe in the dizzying growth curve of the human population, they have, in fact, no more effects than the bloodiest conflicts, Figure 1. Despite a certain decline in the Birth Rate that began in the 1970s (Lesthaeghe, 2010), the scientific developments of the last half century, correlated with capitalist, warlike populationist policies, as well as theological or dogmatic thoughts based on expansion, continue to produce population growth which follows the less optimistic forecasts of the second Meadow report 30- Year Update (Meadows D. H., 1972) (Meadows D. H., 2004) report whose projections have been updated with data provided by the UN in the World 3/2000 simulation model published by the organization: "Institute for Policy and Social Science Research" (Randers, 2004).

Indeed, reality has exceeded the projections of this 1972 report and its 30-Year Update regarding population growth. The world's population will reach around 8 billion in 2022, much earlier than predicted in the pessimistic scenarios of the 1970s and 2000s. In 2020, a study published in The Lancet by IHME projected that even with continued declines in birth rates, the world's population could peak at around 9.7 billion in 2064.

Recent contributions have also illuminated the links between technological systems, resource exploitation, and population dynamics. For instance, Nguyen and Chen (Nguyen & Chen, 2023) integrated IoT and AI technologies for smart population monitoring in urban environments. Rodriguez and Lee (Rodriguez L. M., 2022) modeled energy consumption using non-anthropocentric frameworks, while Patel and Kumar (Patel & Kumar, 2024) assessed the impact of overpopulation on sustainable power systems. In another field Zhang and Wang (Zhang & Wang, 2023) explored eco-innovations in urban infrastructure to mitigate resource overexploitation. These studies underscore the technological dimensions of our challenges, enhancing the need for a paradigm shift in our collective narratives, social imaginaries and infrastructures.

Published by the United Nations Department of Economic and Social Affairs, the World Population Prospects report projects that the global population could reach around 10.4 billion people by 2080 (United Nations, 2022). With potentially disastrous impacts on biodiversity and the climate. Paradoxically, the decline in the birth rate continues to frighten economists and reports from the World Bank and the World Economic Forum (WEF) further emphasize the socio-economic implications of demographic transitions, particularly for regions where rapid aging and reduction working populations could create economic challenges (World Economic Forum, 2022). The WEF's Global Risks Report and World Bank reports also discuss the effects of depopulation in some countries. The WEF's concerns are economic stimuli much more frightening for populations than

those produced by the disappearance of biodiversity or climate change. They produce social imaginaries inclined to favor demographic growth to the detriment of a decline synonymous with loss of wealth and loss of economic comfort (World Bank, 2022).

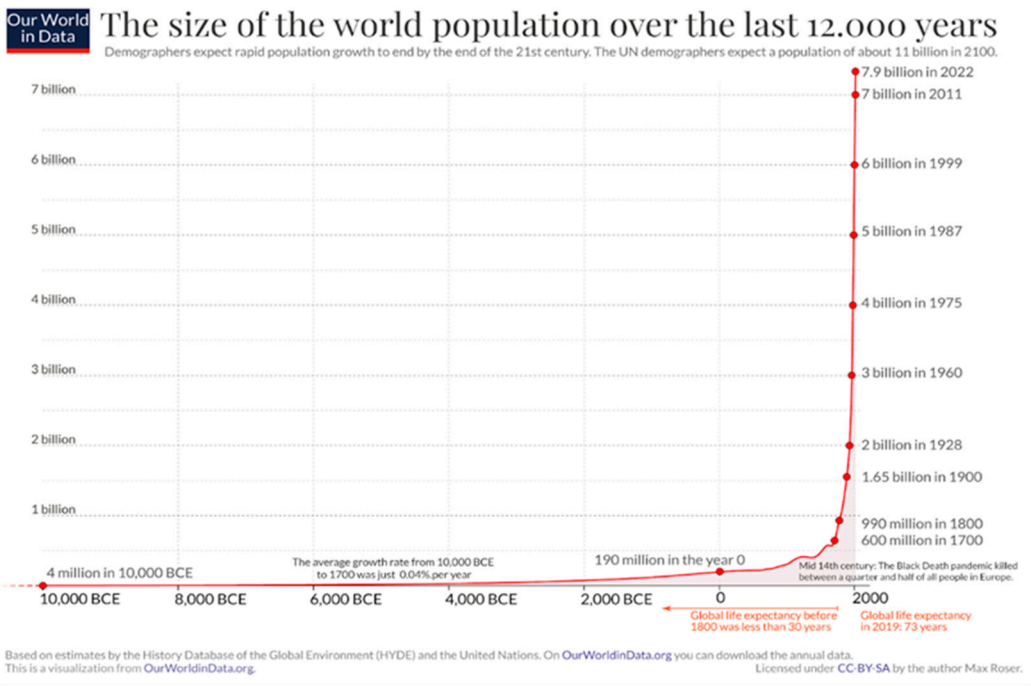

Figure 1. © Ourworldindata.org 2021.Based on the History of the Global Environment (HYDE) and United Nations.

Anthropocentrism supports a social imaginary of power and control of humanity over all biodiversity as well as continuous growth supposed to ultimately conquer and subdue the limits of the universe (Crist, 2017) (Robin, 2013) (Moore, 2016). Even if this growth inexorably follows the law of economic entropy, according to which any exploitation of limited resources produces chaos (Silverman, 2022). Thousands of species of vertebrates and invertebrates are already permanently extinct, and millions still threatened with extinction, in what scientists like Gerardo Ceballos describe as the VI wave of extinction, the only one directly attributable to human activities. Humanity itself risks suffering from its irrational growth (Ceballos, 2015).

Afferents several thousand years old have enabled humans and other animals to survive thanks to primary cerebral mechanisms favoring reproductive principles and those of accumulation of resources (Kelley, 2002). But at the dawn of this new century and because he was able to thwart the mechanisms of his greatest benefactors and predators, Viruses and Bacteria, man should have been able to reassess the loop essential to the survival of all species (Estrella, 2013).

Even though the innate capacity of many mammals causes them to cease all reproductive activity and causes them to enter idle life cycles when resources decrease too quickly in relation to the size of their population (Perry, 2020). Our anthropocentric social imaginations do not produce the stimuli to call into question our principles of demographic growth or consumption (Washington, 2020). All the reports produced by the IISD (International Institute for Sustainable Development), even the most optimistic, show an inevitable deterioration in the happiness of human beings because of their actions in future decades (World Happiness Report., 2024). It seems that, chained in its cognitive biases, optimism biases and SQB (status quo biases) (Sharot, 2011) (Samuelson, 1988), humanity is in a situation of inaction incapable of pragmatism and reflection. Recent study has shown that this optimism bias persists even when advanced technologies are deployed (Wang & Chen, 2022). Thus, SQB can become an issue when there is a crucial need for progress (Godefroid, Plattfaut, & Niehaves, 2023).

2. Non-Anthropocentric Approaches

2.1. Shifting from Anthropocentrism to Biocentrism: Deep Ecology as a Paradigm Shift.

The concept of Deep Ecology, an eco-philosophy derived from intuitive ethical principles, is stated by the Norwegian philosopher Arne Naess one of the founders of this environmental philosophy, as "biospheric egalitarianism in principle" (Naess A. , 1973). It appears to have been first inspired by the birth of modern ecological consciousness, with the work of authors such as the conversationist Rachel Carson (Carson, 1962), the biologist Paul R. Ehrlich and his work "the population bomb" (Ehrlich, 1968) and the advocacy work of environmentalist David Brower (Eliot Porter, 1962). Deep ecologists view the failure of anthropocentrism through the prism of capitalism since the beginning of the industrial era (Naess A. , 1989). They relate the risk that this exacerbated anthropocentrism, with its growth curve and exploitation of exponential resources, will lead biodiversity and therefore also humanity to possible extinction. The concept of Deep ecology, which is opposed in a sense to that of shallow ecology which is described as a form of superficial ecology of good conscience without real positive effects on the biosphere, has been iterated several times by other authors (Devall, 1985) (Fox, 1995).

In 1985 Devall and Sessions proposed the 8 essential non-anthropocentric rules of deep ecology. Among this, the first proposes a global non-anthropocentric approach to knowing how to live on earth and in the universe: "The well-being of human and nonhuman life on earth is of intrinsic value irrespective of its value to humans. » and another promotes a sustainable demographic decline "The flourishing of human and nonhuman life is compatible with a substantial decrease in human population. » (Devall, 1985). While the world had only 4 billion people, Arne Naess and several other leaders of deep ecology argue that the consumerist and materialist paradigm must be replaced and that growth behaviors continue, both economically and in terms of world population must cease by entering a global phase of decline (Naess A. , 1973). From the 1980s, echoing the Meadows report, several Deep ecologists suggested that a total world population of 1.5 billion individuals should not be exceeded to guarantee, in a holistic vision of the world, that a global balance of ecosystems can be developed (Devall, 1985). Arne Naess, for his part maintains that the world should not have more than 100 million individuals to guarantee this balance (Bodian, 1982). In short, he proposes to return to the volume of humans present on earth for more than 40,000 years. If real efforts are made by the followers of environmental education of Ecopedagogy (Harding, 2010). In regards of the latest alarmist reports on global warming, and the persistence of its effects on biodiversity (Pörtner, 2023) (World Resources Institute., 2023) (IPBES., 2023). As well as the global and exponential loss of other species due to human growth activities (Finn, 2023) (University of Birmingham., 2023); Despite more than five decades of intellectual development, the non-anthropocentric principles of Deep Ecology have struggled to find meaningful resonance within contemporary societies. This lack of integration calls for a critical reassessment of their practical influence. Considering this, it appears both timely and necessary to explore alternative avenues for cultivating ecological awareness. Media forms such as cinema, video games, and digital platforms play a central role in shaping collective imaginaries, and thus offer powerful means of engaging wider audiences. Through these cultural vectors, it becomes possible to foster a shift toward non-anthropocentric worldviews; ones that do not position humanity as the steward or guardian of life on Earth, but rather as one participant among many, considering the intrinsic value of each living creature.

2.2. Proposing New Social Imaginaries Through Biocentric Imagination.

The concept of Biocentric Imagination illustrates the cognitive and ethical capacities of imagining a world centred on non-human living beings and not just on humans alone. Originally developed by Aldo Leopold (Leopold, 1949) who promotes the principle that "*an action is right when it preserves the integrity, stability, and beauty of the biotic community*". it encourages us to perceive the Earth as a coherent organism, or "*a mountain*" in Leopold's metaphor. Building on this, Arne Naess introduced nine principles of deep ecology, which foster an expanded empathy toward all living

beings and challenge anthropocentric dominance (Naess A. , 1989). In the same vein, contemporary currents of posthumanism and new animism develop the concept of non-human relationality. It designates a perspective of thinking about the relationships between beings which goes beyond the traditional anthropocentric framework. This pays ethical, ontological and epistemological attention to the relationships between humans and non-humans, whether animals, plants, geological entities, but also artificial objects or intelligence (Jääskeläinen, 2025). Thus, Non-human relationality challenges anthropocentric paradigms by advancing a relational ontology in which existence is constituted through entanglements between human and non-human agents (Haraway, 2020) (Cooper, 2022).

Building on philosophical grounds, film scholar David Ingram argued that media-based imaginaries do not merely reflect dominant cultural values; they actively forge them through narrative and aesthetic strategies (Ingram, 2004) Thus, an ecological critique of cinema (and, by extension, video games) examines how human representations of nature shape everyday ideology. Biocentric imagination opens the possibility of writing stories, scenarios or interactive mechanics where the major point of view is neither human nor machinic, but ecosystemic. And or also, Narrative issues integrate non-human perspectives (e.g. a river, a mountain, a plant, an animal, a herd, or a virus) as agent-actors, promoting the logic of interdependence rather than human exploitation.

As a constitutive element of the Biocentric Imagination, social imaginaries refer to the collective frameworks through which a society defines and understands its social world. These principles have been defined by thinkers like Cornelius Castoriadis or more recently Charles Taylor (Castoriadis, 1998) (Taylor C. , 2004). The shared collective framework's structure social interactions but, as defined by David Ingram, they also produce collective visions of the future, a vision capable of changing or shaping the destinies of societies. The combination of norms, values, beliefs as well as all the symbols forming social interactions, these imaginations allow individuals to forge social relationships as well as a collective historical narrative (Garcia & Chen, 2023).

Within contemporary social imaginaries, media such as video games and films do not merely entertain; they actively participate in the construction, reinforcement, and dissemination of cultural values and collective beliefs. As Janet Murray (Murray, 2017) has shown in Hamlet on the Holodeck, narrative media are instrumental in shaping how individuals imagine agency, possibility, and futures. In the same perspective, Ian Bogost (Bogost, 2007), in Persuasive Games, highlights the procedural rhetoric embedded in game mechanics, demonstrating how video games implicitly teach players ways of thinking about systems, power, and human exceptionalism. More recently, Lee and Patel (Lee, E. F. & Patel, S., 2022), through a computational analysis of video game content, emphasize how mainstream games continue to reflect and reproduce anthropocentric ideologies, privileging human control over nature and progress-driven narratives. Wang and Li (Wang & Li, 2024) further extend this analysis by showing that dominant science fiction and adventure games often frame ecological crises as solvable through technological advancement alone, reinforcing the idea that human innovation is both the source and the solution to environmental decline.

This media-driven construction of anthropocentric futures mirrors patterns, already observed during the Industrial Revolution, when imaginaries of collective flourishing were tightly bound to notions of technological progress and human dominance over the natural world. As Charles Taylor (Taylor C. , 2004) explains in Modern Social Imaginaries, the Enlightenment and post-Enlightenment vision of society was built upon a belief in reason, development, and mastery; ideals that continue to underpin much of today's digital storytelling.

Proposing the development of a non-anthropocentric systemic approach to promote the development of social imaginaries capable of reducing the impact of humans on the ecosystem and the biodiversity that shelters them, may seem ethically fragile. In a world where most humans struggle to fight against social injustices, or quite simply for their survival in search of the most basic resources (Sen, 1999), It may seem inappropriate, even ethically inappropriate, to worry more about the disappearance of animal species, insects or even rivers or forests than about the misfortune of one's fellow human beings. Malthus had pointed out the inconsistency of human expansionist nature

in these terms: "*If it is not curbed, the population increases in geometric progression. Subsistence only increases in arithmetic progression.*" (Malthus, 1798). Later, communism opposed its thinking with the miracle of industrialization supposed to provide more resources through the technology of agriculture and intensive breeding. Marx and Engels assert that social misery is not caused by demographic surpluses but by capitalist economic and social structures; they reject the idea that poverty is a natural consequence of the overexploitation of natural resources and anthropocentrism (Marx K. &., 1845) (Marx K. E., 1975). Many political and theological dogmas still reject Malthusian and biocentric principles (Harris, 1994). Certain authors like Boserup argue in a progressive anthropological position that technological solutions will be implemented to avoid famine and destruction of biodiversity (Boserup, 1981). Moreover, like the philosopher Luc Ferry, ecologists critical of demographic growth and overconsumption are extremist reactionaries inclined to blame the failure of humanity on Third World countries, without considering the consumerism of the richest countries (Ferry, 1992) (Sagoff, 2008). He describes Arne Næss as anti-humanist, in fact claiming the supposed right to anthropocentrism (Ferry, 1992).

However, a non-anthropocentric approach does not reflect a lack of empathy. Indeed, the causal correlation between demographic overgrowth, resource consumption and ecosystem destruction can no longer be ignored (Meadows D. H., 1972) (Meadows D. H., 2004). Rapid population growth intensifies resource strain and drives unsustainable energy consumption patterns, which in turn exacerbate environmental degradation (Doe & Smith, 2023). Finally, the modification of the general climate of our planet, which in view of the paradox described by Fermi is perhaps the only one in the universe to have seen life develop (Fermi, 1950) (Zuckerman, 1995), is probably an additional stimulus to the misfortunes hitting disadvantaged social classes, as well as minorities of all kinds (Kahn, 2005). By precipitating the scarcity of resources essential to the survival of humanity, this has the effect of creating distensions, wars and withdrawals of identity, community and nationalism (Homer-Dixon, 1999). Recalling that the world's two greatest conflicts took place during resource abundance, what will happen to empathy and compassion in a world with limited and diminishing essential resources, such as fresh water, as well as energy?

The construction of our anthropocentric social imaginations based on our cognitive biases of social psychology such as our heuristic bias of judgment and optimism (Kahneman, 2011) leads humanity to adopt a haughty attitude and an inability to objectify the imbalance that our growth induces. If some of these social imaginaries, influenced by the rejection of environmental determinism as expressed in the foundational thought of Lucien Febvre's anthropocentric historiography (Febvre, 2013); particularly in contrast to Friedrich Ratzel or Élisée Reclus; may have been effective in the natural environments that hosted human evolution by allowing evaluation and gain in performance, then they had a functional role. They supported social and industrial revolutions aimed at reducing inequalities and controlling a hostile part of nature, at least for certain populations (Harari, 2014). However, they now prove unsuitable when confronted with the questions of proportion and harmony that should inspire us today.

It is precisely another future, another field of possibilities, non-anthropocentric, based on the balance and sharing of our current ecosystem that we would like to support and propose in the collective construction of new social imaginaries, through media like video games and cinema. In an analysis of the influence and role of the media in the creation of a new environmental culture, Vesselina Valkanova concludes: "*today's decisive media influence regarding the formation of values and worldview positions should be directed to the preservation and protection of the environment, biodiversity, and cultural diversity.*" (Valkanova, 2024). The construction of an ecological ethics specific to the fields of media is already the subject of research in communication, this means the subset of ethics which is interested in "*how human beings ought to behave in relation to non-human nature*" (Curry, 2011), it is for many communication researchers a fundamental challenge of our time (Maxwell, 2008). Forging new perspectives on the social imaginary through an ecological ethic; one that envisions a humanity with a population size balanced in relation to other species, respectful of the intrinsic value of all living beings, and seeking to apply its remarkable intelligence toward remaining as unobtrusive as possible

through a consciously limited interaction with the natural ecosystem to which it belongs; appears to us today as a crucial imperative.

3. Developing a Framework for the Assessment of Non-Anthropocentric Media Values

The creation of a tool for evaluating the non-anthropocentric value of a media seems to us to be an essential step in the process of creating non-anthropocentric media capable of modifying social imaginations. This subjective semantic questionnaire is intended for the game director, movies director or writer and it can be used throughout the creation process or to assess the relevance of the non-anthropocentric impact of the media versus others. Media sharing or not these concerns. We designed the questionnaire following the recommendations of Osgood, Suci & Tannebaum who are references in this field (Osgood, 1957) (Suci, 1967). As well as the work of reference authors like DeVellis and Nunnally's systemic processes for iterative evaluations thereof (DeVellis, 2016) (Nunnally, 1994).

3.1. Conception of the BMEQ Semantic Questionnaire

The design of the semantic subjective form followed a structured approach grounded in psychometrics, measurement theory, and semantic analysis. By following the steps described below: Finding the Non-Anthropocentric value $\boldsymbol{NAv}$, defining the respective dimensions values $\boldsymbol{D_i}$ of $\boldsymbol{NAv}$ value. Definition and application of coefficients $\boldsymbol{\alpha_i}$ of each dimension. Calculating the value of $\boldsymbol{NAv}$ is expressed in the following equation:

$$\boldsymbol{NAv} = \frac{\sum_{i=1}^{5}(\boldsymbol{\alpha_i} \times \boldsymbol{D_i})}{\sum_{i=1}^{5} \boldsymbol{\alpha_i}}$$

Developing questions for each dimension is an essential part of the process; each dimension is assessed through 5 semantic questions designed through the Schwarz recommendation (Schwarz, 1994) structured on an odd Likert scale from 0 to 5 (Likert, 1932) with differential semantic scales included (from “Never!” to “All the time!”). The questionnaire is thus structured in 5 dimensions containing a total of 25 questions. As recommended by the Michael Furr process, we conducted several iterative pilot tests with small groups to ensure the questions are cleared and the data collected is valid (Furr, 2011).

Building on a synthesis of established theoretical models and previous evaluation instruments (including the NEP, New Ecological Paradigm (Dunlap, Van Liere, Mertig, & Jones, 2000), , the Media Health Literacy scale MeHLit, (Koc, 2022) and the Ecocentric and Anthropocentric Scales (Thompson, 1994)) we outline the following development process. The first step involves a clear theoretical definition of the construct to be measured. This is followed by the generation of a large and diverse pool of items, formulated to be both clear and unbiased. A suitable Likert-type scale is then selected (Likert, 1932), to capture gradations in participant responses. The questionnaire is subsequently pilot tested with a small sample, allowing for refinement based on feedback. Statistical validation is performed through factor analysis and internal consistency measures such as Cronbach’s alpha (Cronbach, 1951), ensuring that the instrument reliably reflects the intended dimensions. The next stage involves assessing validity by comparing the results with existing instruments and expected theoretical patterns. Iteration is incorporated throughout the process to optimize both conceptual alignment and psychometric robustness.

3.2. Dimensions, Items, and Coefficients

Initially the first of the dimensions that we included in our questionnaire corresponded to the dimension of $\boldsymbol{FI}$ of the “Fun Interest” of each media. Supported by a large scientific literature, we evaluated the relevance of each media in terms of interest to ensure its impact in terms of social imagination.

After our first iterations, it appeared to us that the "Fun interest" dimension of all the test questionnaires was high and corresponded to strong interest, which seems consistent with the fact that each evaluator chooses a media of which he has a strong knowledge. However, this high value introduced a bias into our evaluation by affirming that none of the media evaluated reached extreme low values and suggesting that none of the media were totally anthropocentric. A media like the soccer simulation video game (Electronic Arts, 2017), for example, did not appear to be totally anthropocentric, even though nothing in this video game allows us to assert that it is not. Also, this dimension of "Fun interest" was deleted to retain only dimensions corresponding to an evaluation of non-anthropocentrism.

The definition of the dimensions of non-anthropocentric and biocentric value of media led us to the development of 5 interconnected dimensions through 25 questions. The questions items both emerging from iterative reflective analysis and previous evaluation tools such as: NEP (Dunlap, Van Liere, Mertig, & Jones, 2000), MeHLit the Media Health Lit (Koc, 2022), and the Ecocentric and Anthropocentric Scales (Thompson, 1994). Like NEP and MeHLit, every item in the BMEQ is scored using a discrete Likert-like format 0–5; (Likert, 1932) paired with a semantic-differential anchor ranging from "Never!" (0) to "All the time!" (5), thereby preserving interpretive alignment across survey instruments. The BMEQ was explicitly crafted to function in both large-scale and customized media evaluation environments. It is thus equally suitable for academic researchers and students conducting comprehensive, cross-medium assessments, as for media producers aiming to critically appraise the non-anthropocentric dimension of their own creations. The first section of the questionnaire is dedicated to collecting demographic background data, such as age, gender, and education level in an academic context. In situations where a more focused, individualized analysis of a single medium is desired, this section may be streamlined or omitted. This is followed by a segment that gathers key details about the evaluated media, including its title, format (e.g., film, animated feature, video game), publisher or director, and year of release.

The first dimension is listed under the name: Ec, for Ecocentric Dimension. This dimension highlights the Ecocentric value of the media and its capacity to consider that all forms of life, human and non-human, have dynamic values and deserve equal respect (Naess A. , 1973) (Naess A. , 1989). Thus, for Taylor each living organism is considered as a "*teleological center of life*" with its own value (Taylor P. W., 1986). This dimension consists of the 5 following items:

1- The media was considering the intrinsic (inherent) value of all forms of life (like animals, or insects)?

2- The media was considering humans as not inherently superior to other living things. (like animals or insects)?

3- The media was considered intrinsic (inherent) value of all forms of natural things (like mountains, forest, or rivers)?

4- The media was considering all species are part of a system of interdependence?

5- The media did not promote the exploitation of other species or environments as resources for humanity?

The second dimension: St, reflects the Sustainability values of the media by focusing questions on Global Warming, the destruction of the integrity of the biosphere and pollution by measuring to what extent the media alarms on these facts. This dimension evaluates the media's desire to induce a reduction in the human footprint, by adjusting practices to minimize their negative impacts on other species and more generally on the planet (Callicott, 1994). This dimension comprises five items:

1- Does the media alarming about climate change?

2- Does the media alarm about Biosphere integrity (acceleration of species extinction)?

3- Does the media alarm about pollution / contamination?

4- Does the media promote better lifestyle Consumption / habits (lifestyles aways from excessive consumption of resources like energy)?

5- Does the media alarm about land system change (Land use) change in the amount of forest cover, change in the amount of cropland?

The value of the third dimension Sd reflects the media's desire to alarm the consequences of a constantly growing demographic (Devall, 1985) (Meadows D. H., 1972). As well as on the impact and responsibility of each human being in the consumption of limited resources as well as in putting into perspective the anthropocentric perception of other species as resources in the service of humanity (Naess A., 1973) (Finn, 2023). This dimension comprises five items:

1- Does the media alarm about population growth impact?
2- Does the media promote human population regulation?
3- Does the media alarm population growth impact on biodiversity?
4- Does the media promote a fair balance of human population regarding other species volume of populations?
5- Does the media promote more discreet human activities and behavior regarding other living forms?

The fourth dimension explored is the Ma, questionnaire, for "Away From Media" AFM, focuses on the supposed real direct effects of the media in producing positive consequences on biodiversity. For example, by instantly offsetting carbon production or by generating greater human discretion regarding biodiversity in gamified applications or games. This dimension responds to the need for immediate actions noted by biocentric or non-anthropocentric authors highlighting the need for direct and immediate action in the face of environmental crises and threats to biodiversity (Lovelock, 2006) (Bookchin, 1982) (Jensen, 2006) (Taylor P. W., 1986) (Naess A. , 1973). This dimension comprises five items:

1- Does the media have real AFM positive impacts to biodiversity preservation?
2- Does the media have real positive AFM impacts on energy consumption?
3- Does the media have AFM real positive effects on human population regulation?
4- Does the media have real AFM impact on humans vanishing in their natural environment? Making humans more discreet, more invisible to other species?
5- Does the media have any real AFM positive effects?

Finally, the last of the dimensions evaluated by the questionnaire is the Ai, for "Anthropocentric Insignificance". This dimension rejects anthropocentrism from a perspective of decentering according to which humans are neither the center nor the summit of existence or value in the universe (Sagan, 1994) (Berry, 1999) (Morton, 2010). This dimension comprises five items:

1- In the media human feelings are insignificant (A little value or importance)?
2- Does the media promote the idea of human insignificance compared to the rest of biodiversity?
3- Does the media promote the idea of human insignificance compared to the rest of Universe?
4- Does the media promote naturalist philosophy? Nothing is supernatural, nature would be the only reality.
5- Does the media promote the exclusion of all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose?

- $\boldsymbol{Ec}$ = Dimension Ecocentric
- $\boldsymbol{St} = "Dimension\ Sustainability"$
- $\boldsymbol{Sd} = "Dimension\ Sustainability\ Demographic\ Decline"$
- $\boldsymbol{Ma} = "Dimension\ Media\ AFM\ Effects"$
- $\boldsymbol{Ai} = "Dimension\ Anthropocentric\ Insignificance"$

Are the respective dimension values.

Using the systematic framework for creating subjective semantic questionnaire measurement scales proposed by DeVellis, emphasizing the need for multiple iterations (DeVellis, 2016). As well

as the principles listed by Nunnally (Nunnally, 1994), we refined the values of each dimension during exploratory factor analysis to best reflect a balance in all the responses before our Cronbach reliability evaluation tests (Cronbach, 1951). These iterations made it possible to add the following coefficients to each of the dimensions:

$$\boldsymbol{NAv} = \frac{(\mathbf{5} \times \boldsymbol{Ec}) + (\mathbf{4} \times \boldsymbol{St}) + (\mathbf{1} \times \boldsymbol{Sd}) + (\mathbf{1} \times \boldsymbol{Ma}) + (\mathbf{4} \times \boldsymbol{Ai})}{\mathbf{5} + \mathbf{4} + \mathbf{1} + \mathbf{1} + \mathbf{4}}$$

The overall BMEQ media score is obtained by weighing specific dimensions, summing the resulting products and dividing that total by 15, yielding the normalized composite score. (Ec*5+St*4+Sd*1+Ma*1+Ai*4) /15 = points.

3.3. Evaluation

A Cronbach alpha reliability analysis (Cronbach, 1951) was conducted on data collected from 242 participants, based on 138 media items evaluated using the BMEQ— a subjective semantic questionnaire designed to assess the non-anthropocentric value attributed to media content (Tabachnick, 2019) (Tavakol, 2011) (Field, 2013).

A total of 3450 responses on a Likert scale from 0 to 5 (Likert, 1932). Scale reliability Statistics: **Cronbach' α scale= 0,966.** Analysis of internal consistency, measured by Cronbach's alpha coefficient; revealed excellent reliability of the scale with a coefficient α = 0.966, which indicates very high consistency of the questionnaire items.

4. Experiment

A total of 138 media works were evaluated using the BMEQ questionnaire by paid adult participants (n = 242) from UK and USA, via the online research platform Prolific Academic Ltd. Mean age 41.3 years, Median age: 40 years, standard deviation ~13.1. Our sample shows a wide age distribution ranging from 18 to 79 years, with a mean age around 41, suggesting that our participant group includes a broad spectrum of adult age groups, from young adults to seniors. The distribution appears skewed to the right, indicating a small concentration of older participants. Among the 242 participants included in the study, 154 identified as female (63.64%) and 88 as male (36.36%). This gender distribution indicates a predominance of female participants within the sample. Most participants (n = 175; 72.3%) reported being employed full-time. A smaller part (n = 34; 14.0%) indicated part-time employment. Individuals not currently in paid work (including retirees, homemakers, and those with disabilities) constituted a notable minority (n = 20; 8.3%), while a smaller proportion (n = 6; 2.5%) reported being unemployed and actively seeking employment. Additionally, two participants (0.8%) were due to begin new employment within the following month, and ten participants (4.1%) selected “Other” as their employment status. A total of 7 cases (2.9%) were reported as expired or invalid data Employment status.

The initial sample included 356 participants; however, a few responses were excluded from the final analysis to ensure the reliability and integrity of the data. These exclusions were made on ethical and methodological grounds, as some responses appeared to have been generated randomly or failed to align with the expected evaluative patterns, indicating a lack of engagement with the questionnaire's content. Several independent studies have reported superior data quality and participant attention on the alternative online platform Prolific, compared to that of CloudResearch, MTurk, Qualtrics and SONA (Douglas, 2023) (Albert, 2023). Participants were explicitly instructed to evaluate only those video games or films they had personally played or viewed. Each participant was permitted to complete the questionnaire up to four times, selecting a different media item from a predefined list curated by the research team for each submission. The distribution of these media was carried out in four groups: **G1** is 50 bestselling video games since 1984, related to compilation of sources such as AFJV, Gamesider, VGChartz, NDP group and IGN. **G3** corresponds to the list of the 50 films and animated films, having generated the most revenue since 1993, with sources from IMDbPro, Box Office, Mojo and Nash Information’s Services "The Numbers". **G2** corresponds to a selection of 20 supposedly non-anthropocentric video games selected by the CNAP, Center for Non-Anthropocentric Play (CNAP, 2025). Finally, the **G4** group corresponds to a selection of 17 movies and animated movies for which the specialized press has noted the non-anthropocentric or biocentric character. The distribution of the results of these media is reported in the chart below, Figure 2.

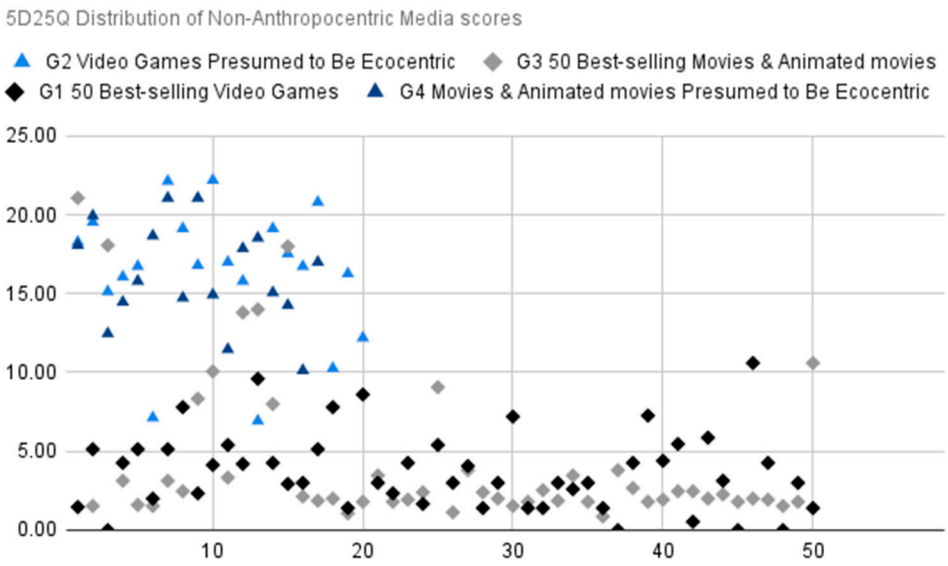

Figure 2. BMEQ Distribution of Non-Anthropocentric Media scores.

General data:

Score range: Values vary between 0 (lowest score) and 22.20 (highest score). These scores represent an underuse of the total scale, which ranges from 0 to 25. The absence of a high score can be revealed by the very low scores of the dimension ***Ma*** In fact, few media really have real AFK effects at this stage with an overall positive response score of only 0.58%.

$$[\boldsymbol{MA} = \left(\frac{20}{3450}\right) \times 100 \approx 0.58\backslash\%]$$

Interpretation:

Concentration around low to average scores:

The Average (μ): 7.35 shows that many media studied have an overall anthropocentric character. Higher scores >20 but they are in the minority. This likely reflects a strong inclination of video games and movie media to represent the world from an anthropocentric point of view, with a more activist tendency of some of these media to be intentionally non-anthropocentric and biocentric. The Standard Deviation (σ): 6.63 indicates a concentration around the mean with a wide variation. These data illustrate a dominant anthropocentric balance with more limited attempts at non-anthropocentrism.

4.1. Score Distribution

For the G1 group representing the 50 Best-selling video games, the mean is (μ): 3.76 for possible scores range from 0 to 25. Suggest that most of the media evaluated are concentrated at the lower end of the range. This may reflect an overall anthropocentric bias in the most sold video game in the world, failing to prioritize biocentric or non-anthropocentric narratives. G1 Standard Deviation (σ): 2.50 reflects moderate variability, with most scores relatively consistent and close to the mean.

In the G2 representing the results of Video Games "presumed to be Non-Anthropocentric and Ecocentric" mean (μ): 16.3 3 is 65.2% of the maximum possible score (25) which suggests strong adherence to non-anthropocentric or biocentric principles. This is consistent with media explicitly designed to prioritize ecological and biocentric narratives. The Standard Deviation (σ): 4.28 reflects moderate to high variability, this spread could reflect a diversity of interpretation of non-anthropocentric and biocentric values in G2.

As for the G1 group G3, which represents the best-selling movies and animated movies the mean (μ): 4.36 indicates these films exhibit only a weak alignment with non-anthropocentric values. They

are predominantly anthropocentric in nature. 95% Confidence Interval: Within \mu\pm2\sigma about 95% of the scores are expected to fall between −5.42 and 14, further demonstrate that most scores will cluster in the low range. G3 Standard Deviation (σ): 4.89 indicates substantial variability in the scores. Some films achieve moderate alignment with non-anthropocentric values, while others score near 0, showing minimal alignment.

The G4 score representing the group presumed to be non-anthropocentric and biocentric movies and animated movies span from 0 to 25, with a mean (μ): 16.2 2 positioned relatively higher on the scale compared to previous groups like G1 (μ): 3.76 and G3 (μ): 4.36, but close to the G2 (μ): 16.3. The average indicates a moderate alignment with non-anthropocentric and biocentric values. With 64.8% of the maximum score (25), this suggests that movies and animated movies of this selected group generally adhere to ecocentric narratives more than anthropocentric ones but still leave room for improvement. G4 Standard Deviation (σ): 3.21 21 indicates if the group is largely consistent in its alignment with non-anthropocentric themes, there are still some considerable variabilities.

4.2. Experimental Conclusions and Scoring Scale Proposal for the BMEQ

Inside group G1 Mainstream media, might naturally prioritize human-centered narratives due to audience expectations. When G2 represents a group with a strong and consistent alignment with non-anthropocentric or biocentric principles. While there is some variability, most media perform well, positioning this group as a benchmark for ecocentric values. While G1 and G3 share low mean scores, the greater variability in G3 suggests more opportunities for films to achieve moderate alignment, albeit inconsistently. G4's meaning is comparable to G2, indicates that selected presumed movies and animated movies are generally with similar values as the group of CNAP selected presumed non-anthropocentric video games. Which means that these media are sharing a similar focus on non-anthropocentrism.

Moderate Variability: High scores (up to 20.82) show that some media outlets are attempting to move beyond anthropocentric narratives, but these efforts remain isolated.

We perform a One-Way Kruskal-Wallis ANOVA, the high value of $\chi^2 = 70.3$ suggests a substantial difference between groups. There is a significant variation in scores between the different groups, this difference is statistically significant with p-value < 0.001 which allows us to reject the null hypothesis which stipulates the equality of the medians of the groups. Finally, $\varepsilon^2 = 0.517$ indicates a moderate to large effect size. The difference between the groups is therefore significant, but also the difference between the groups is substantial. There are therefore notable differences between the G1, G2, G3 and G4 groups, and these differences are large enough to be considered significant from a statistical and practical point of view.

We then carried out an independent Samples T-test between the two groups G2 and G4 Media Scores which correspond to the two presumed Biocentric groups, to see if differences existed between the presumed biocentric group of video games and that presumed biocentric of Movies and animated movies.

Independent Samples T-Test

		Statistic	df	p	Mean difference	SE difference
Presumed Biocentric Games & Movies Media Scores	Student's t	0.0634	35.0	0.950	0.0802	1.26

Figure 3. BMEQ Distribution of Non-Anthropocentric Media scores.

It appears that p-value 0.950 indicates no statistically significant difference between the presumed biocentric video games scores (group G2) and biocentric movies media scores (group G4). The null hypothesis (*H*0: μG2 = μG4) cannot be rejected, as there is insufficient evidence to suggest that the means of the two groups differ. The test provides strong evidence that the scores for presumed biocentric games (G2) and biocentric movies (G4) are not significantly different, supporting the idea that both types of media may be perceived as equally biocentric in terms of the evaluation criteria. This gives a good indicator of the markers of the biocentric and non-anthropocentric values of the expected scores in the BMEQ questionnaire during the evaluations. The 2 groups scores may be perceived as moderate to highly non-anthropocentric.

A second Independent Samples T-test was also carried out on the two dependent variables G1 representing the 50 best-selling video games and G3 representing the 50 best-selling movies. The p-value 0.445 indicates no statistically significant difference between the 2 groups, the null hypothesis (*H*0: μG1 = μG3) cannot be rejected, and the test provide strong evidence that the groups scores may be perceived as equally very to anthropocentric.

4.3. Suggested Scale Range for the BMEQ Questionnaire

Considering the average results of the groups, here is the suggested range for each category based on the scoring system provided:

- **Below 5 points: Very anthropocentric**

This category represents media that are heavily anthropocentric and emphasize human interests and perspectives.

- **6–10 points: Anthropocentric**

This category represents media that are still human centered, but with some subtle inclusion of environmental or non-anthropocentric themes.

- **11–15 points: Moderately non-anthropocentric**

This category includes media that gradually incorporate more biocentric or ecocentric values, though they still retain a focus on human perspectives to some extent.

- **16–22 points: Highly non-anthropocentric**

This range represents media that strongly emphasize non-anthropocentric or biocentric narratives, reflecting a deep concern for environmental and non-human perspectives.

- **23–30 points: Non-anthropocentric activist**

This category includes media that actively advocate for non-anthropocentric or biocentric values, often aiming to inspire environmental or social change, and showing a clear commitment to activism.

5. In-Depth Comparisons with NEP

Although several instruments exist to measure individuals'ecological worldviews or their connectedness to nature, there does not appear to be a standardized questionnaire specifically designed to assess the non-anthropocentric dimension or the ecological content of media. While instruments such as the Connectedness to Nature Scale (Mayer & Frantz, 2004) and the Nature Relatedness Scale (Nisbet, Zelenski, & Murphy, 2009) could serve as indirect benchmarks for our BMEQ tool, these scales primarily focus on individual cognitive, emotional, and affective interpretations, and therefore do not offer a direct basis for comparison. In contrast, the New Ecological Paradigm (NEP) Scale (Dunlap, Van Liere, Mertig, & Jones, 2000) measures the endorsement of ecological values and a non-anthropocentric worldview among individuals.

The questionnaire consists of 15 items, divided into odd- and even-numbered statements. Agreement with the even-numbered items reflects alignment with the Dominant Social Paradigm (DSP), which corresponds to current anthropocentric social imaginaries. Conversely, agreement with the odd-numbered items indicates support for the NEP, which is more closely associated with biocentric and ecocentric, non-anthropocentric perspectives.

The original NEP items have been slightly adapted to suit the analysis of media content in video games and cinema. The resulting reformulated items are as follows:

1- The media content suggests that humanity is approaching the ecological limits of the Earth's capacity to support human life.
2- The media portrays the belief that humans have the right to alter the natural environment to fulfill their needs.
3- The media implies that human interference with nature frequently results in harmful or disastrous consequences.
4- The media conveys confidence that human ingenuity will prevent the Earth from becoming uninhabitable.
5- The media depicts humanity as significantly contributing to environmental degradation.
6- The media promotes the view that Earth has abundant natural resources, provided we develop them appropriately.
7- The media supports the idea that non-human life—plants and animals—possesses equal rights to exist as humans do.
8- The media reflects the belief that nature's balance is robust enough to withstand the impact of modern industrial societies.
9- The media acknowledges that, despite their unique capabilities, humans remain subject to the fundamental laws of nature.
10- The media downplays the severity of the current ecological crisis, implying it has been largely overstated.
11- The media likens Earth to a spaceship, emphasizing its finite space and limited resources.
12- The media supports the anthropocentric notion that humans are destined to dominate the rest of nature.
13- The media represents the balance of nature as fragile and easily disturbed.
14- The media suggests that humans will eventually acquire sufficient knowledge of nature to fully control it.
15- The media warns that, if current trends continue, a major ecological catastrophe is likely soon.

As for the BMEQ questionnaire, a Likert scale ranging from 0 ("Never") to 5 ("All the time!") was employed to evaluate each item (Likert, 1932). A total of 69 media previously used in the BMEQ study were subsequently assessed with the modified NEP questionnaire; comprising 32 video games, 4 animated films, and 33 movies; by 155 paid adult participants via the same online research platform (Prolific Academic Ltd) used in earlier experiments and participants University. Although the initial sample included 223 participants, a subset of responses was excluded from the final analysis to ensure the reliability and integrity of the data.

Since the total number of NEP items is odd, resulting in an uneven distribution between paradigms, the NEP score was computed using 8 items while the DSP score was derived from 7 items. To address this imbalance and enable meaningful comparisons, a normalization algorithm was developed and expressed in percentage terms. This approach incorporates an inverted DSP value into a unified global NEP index, thereby representing a continuous measure of the biocentric orientation of the evaluated media.

We employ a normalization algorithm wherein DSP responses are inverted and integrated into a unified global NEP index, reflecting a continuous ecological orientation.

$$NEP_{\{global\}} = \frac{\left\{\sum_{\{i=1\}}^{\{9\}} x_{\{NEP_i\}}\right\}}{45} x100 + \frac{\left\{35 - \left\{\sum_{\{j=1\}}^{\{7\}} x_{\{DSP_j\}}\right\}\right\}}{35} x100$$

- $\{x_{\{NEP_i\}}\}$: score for NEP item number i, ranging from 0 to 5.
- $x_{\{DSP_j\}}$: $score\ for\ DSP\ item\ number\ j, ranging\ from\ 0\ to\ 5$.
- 45: $maximum\ NEP\ score\ (9\ items\ \times\ 5)$.
- 35: $maximum\ DSP\ score\ (7\ items\ \times\ 5)$.
- $35 - \sum x_{\{DSP\}}$: $inversion\ of\ DSP$

  $(the\ lower\ the\ value, the\ more\ ecologically\ oriented\ it\ becomes)$.

The final global NEP score ranges from –100 to 100, with values below 0 indicating a fully anthropocentric perspective consistent with the prevailing Dominant Social Paradigm, values above 0 (up to 100) reflecting a fully ecocentric stance, and a score of 0 representing a neutral, balanced position between NEP and DSP orientations, without a clear ideological leaning.

5.1. Results

An analysis of the dataset reveals a considerable spread in the scores, Figure 4. The observed values range from approximately –25.71 to about 78.73, resulting in a spread of roughly 104.44. With an overall mean near 12.5, the responses tend to be modestly skewed toward the positive end. Based on prior observations from the BMEQ results, the data appears to reflect a median DSP value slightly above 0, which is likely around 10. This suggests that most media within groups **G1** and **G3** typically do not incorporate ecocentric perspectives, but rather display consumerist orientations strongly aligned with the DSP framework. Additionally, the high standard deviation indicates significant dispersion around the mean, reflecting marked variability among respondents. This distribution suggests that the underlying concept reflects a continuum of orientations, with some media showing a pronounced anthropocentric bias, while others lean strongly toward an ecocentric perspective. At this stage in the analysis, the dispersion observed in the distribution of Non-Anthropocentric Media Scores (NEP), Figure 4. Closely mirrors that observed in the distribution of the BMEQ, Figure 2.

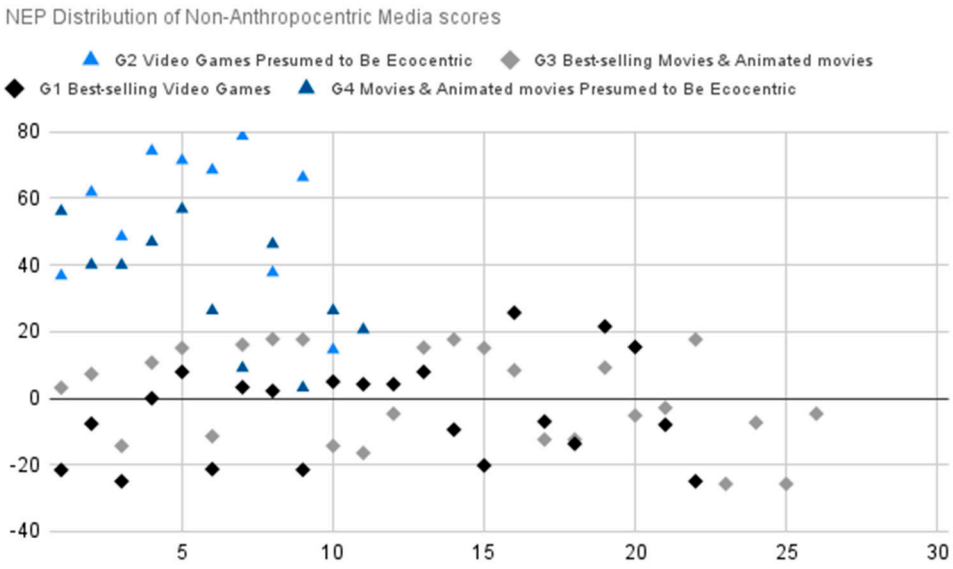

Figure 4. – NEP Distribution of Non-Anthropocentric Media scores.

Descriptives		
	BMEQ	**NEPglobal**
N	69	69
Mean	7.97	12.5
Std. error mean	0.858	3.27
Median	5.13	7.94
Mode	5.13	17.7
Standard deviation	7.13	27.2
Variance	50.8	740
Minimum	0.00	-25.7
Maximum	22.2	78.7
Skewness	0.768	0.753
Std. error skewness	0.289	0.289
Shapiro-Wilk W	0.839	0.934
Shapiro-Wilk p	< .001	0.001

Figure 5. – Descriptives of the BMEQ NEPglobal analyses.

The descriptive statistics indicate that the BMEQ variable, designed to assess the non-anthropocentric engagement of media content, has a mean of 7.97, a median of 5.13, and a standard deviation of 7.13. These figures suggest a moderate inclination towards ecocentric perspectives. In contrast, the NEPglobal measure, which encompasses both anthropocentric and ecocentric orientations, exhibits a mean of 12.5, a median of 7.94, and a notably higher standard deviation of 27.2. The NEPglobal scores range from –25.7 to 78.7, reflecting substantial variability. Negative values indicate media with strong anthropocentric characteristics, whereas positive scores denote a shift towards ecocentric evaluations.

Both variables display moderate positive skewness (approximately 0.75), and the Shapiro–Wilk tests ($p < 0.001$ for BMEQ and $p = 0.001$ for NEPglobal) confirm significant deviations from normality in their distributions. These findings suggest that while a significant portion of the evaluated media tends to exhibit anthropocentric orientations, there is a notable minority that reflects ecocentric perspectives, contributing to a heterogeneous pattern of media engagement.

Paired Samples T-Test					
			statistic	**df**	**p**
BMEQ	NEPglobal	Student's t	-1.70	68.0	0.093

Note. H_a μ Measure 1 - Measure 2 $\neq 0$

Figure 6. NEP global Paired Samples T-Test.

Our analysis shows that BMEQ and NEPglobal yield statistically similar scores. The paired samples t-test ($t = -1.70$, $df = 68$, $p = 0.093$) found no significant difference between the two, suggesting

that any observed gap in mean scores is most likely due to random variation rather than a meaningful divergence.

Figure 7 presents the set of media items evaluated in both the BMEQ and NEPglobal questionnaires. The variable N indicates the number of repeated evaluations submitted by participants. A paired-samples t-test revealed a significant difference in evaluation counts between the two instruments, with $t(68) = -4.35$, $p < .001$, indicating that participants completed the NEPglobal assessments more frequently, on average, than the BMEQ evaluations. This disparity in total evaluations between the BMEQ (N = 223) and NEPglobal (N = 356) measures can be largely attributed to the differing participant pool sizes and the allowance of up to four submissions per individual. In repeated-measures designs, larger samples and multiple entries per participant naturally produce higher overall counts, particularly when the number of repeats varies between subjects. However, this well-documented phenomenon of sample ratio mismatch, when considered alongside the interpretation of the paired-samples t-test comparing BMEQ and NEPglobal scores for the same media items; yielding $t(68) = -1.70$, $p = 0.093$, not significant; suggests that, despite differences in sampling protocols and tolerance for repeated submissions, the two questionnaires produce comparable overall scores. The absence of a significant mean difference demonstrated in paired testing confirms the reliability of the BMEQ instrument, as its results closely align with those of the established NEP scale on the same sample. The consistency of these findings across varying group sizes and response frequencies further underscores the robustness of the BMEQ, affirming that its scores are not unduly influenced by methodological artifacts but genuinely reflect non-anthropocentric engagement in media content.

G1	5D25Q	N	NEP	N
Minecraft	1.47	3	-21.53	6
Call Of Duty MW	5.13	1	-7.62	2
Grand Theft Auto V	0	4	-24.92	2
Wii Sport	4.27	1	0	1
COD BlackOps II	5.13	1	7.94	1
PUBG	2	2	-21.27	2
Call Of Duty MW III	5.13	2	3.33	1
RedDead Redemp II	2.33	1	2.22	1
Terraria	4.13	2	-21.48	2
Tetris	5.4	2	5	4
Animal Crossing	9.6	1	4.23	3
Super mario Bros	3	1	4.23	1
COD BlackOps	5.13	1	7.94	1
Mario Kart Vii	7.8	2	-9.42	4
Tetris / DX	5.4	1	-20.16	2
The walking Dead	4.07	1	25.71	1
Nintendogs	2.6	1	-6.98	1
Super mario World	3	1	-13.65	2
The Witcher III	7.27	2	21.59	1
Hogwarts Legacy	4.4	1	15.4	1
FIFA 18	0	3	-7.94	2
GTA IV	0	3	-24.92	2

G2	5D25Q	N	NEP	N
Eveything	18.27	3	36.83	4
Gibbon	19.53	1	61.9	1
Flower	16.07	2	48.57	3
Shelter	16.73	1	74.29	3
ECO	7.13	2	71.43	1
Endling Extinction	22.13	1	68.57	2
Tokyo Jungle	19.13	1	78.73	1
Mountain	22.2	1	37.78	3
Abzu	17	2	66.35	1
Journey	15.8	1	14.6	4

G3	5D25Q	N	NEP	N
Titanic	3.13	3	7.3	5
Avengers: Infinity war	1.53	2	-14.29	1
The Lion King	8.33	6	10.72	9
Frozen II	10.07	1	15.11	4
Barbie	3.33	3	-11.38	6
The Lord of the Rings	8	3	16.11	4
Finding Dory	18	1	17.78	1
Jurassic World	2.13	4	17.67	6
Avengers	1.87	2	-14.29	1
Top Gun: Maverick	1.07	2	-16.43	4
Harry Potter DH 2010	1.8	1	-4.63	1
Star Wars, episode VIII	1.93	1	15.24	3
Jurassic World 2018	2.4	1	17.67	1
Frozen	9.07	3	15.11	6
Beauty and the Beast	3.8	2	8.41	6
Minions	1.53	1	-12.38	1
Spiderman Far from home	2.53	2	-12.38	1
Captain Marvel	1.87	1	9.21	1
Skyfall	0.87	2	-5.16	4
Transformers 2014	3.8	5	-2.86	4
Jurassic World	2.67	2	17.67	6
Pirates OT Caribbean: 2006	2	2	-25.71	1
Alladin	1.8	1	-7.3	2
Pirates OT Caribbean 2011	2	1	-25.71	1
Harry potter 2001	1.8	2	-4.63	5
Avengers: Endgame	1.53	1	3.17	1

G4	5D25Q	N	NEP	N
Princess Mononoke	18.07	2	56.19	3
The wild Robot	19.93	2	40.11	3
The secret of Kells	12.47	2	40	1
Wall-E	21.07	5	46.98	4
Okja	18.67	2	56.83	2
Avatar	21.07	2	26.35	4
Interstellar	15.07	2	9.08	5
Annihilation	14.27	1	46.35	1
Children of Men	10.13	1	3.17	2
Avatar	21.07	2	26.35	4
Avatar II	18.07	1	20.63	1

Figure 7. Comparative Results of BMEQ and NEP Questionnaires Across Selected Media. 2.

Results indicate similarity in the average scores of the two questionnaires. As the revised NEP questionnaire is considered the most widely used environmental values and attitude measure in the world (Dunlap, Van Liere, Mertig, & Jones, 2000), this consolidates the reliability of the results of our BMEQ questionnaire of the non-anthropocentric nature of the media.

6. Conclusion on the BMEQ Section

The evaluation outcomes of our subjective semantic questionnaire, developed to measure non-anthropocentric media values, indicate a high degree of reliability. Iterative refinements during its creation contributed to the development of a robust instrument capable of encompassing a wide range of anthropocentric and non-anthropocentric values across diverse media types, both interactive

and non-interactive. The BMEQ differs from traditional biocentrism instruments such as the NEP scale in that it embeds its evaluation directly into media content rather than assessing abstract environmental attitudes. If established measures like the Connectedness to Nature Scale (CNS) are valuable for capturing an individual's emotional or cognitive disposition toward nature, they neglect the specific role that media, such as films, video games, or animations, play in shaping social imaginaries. By contrast, the BMEQ is purpose-built to analyze how such media portray non-anthropocentric themes and cultivate ecocentric and biocentric engagement. This media-centered approach offers advantages over broader environmental questionnaires currently used in sustainability and media studies, providing granular insights into the representations that influence social imaginaries. As such, the BMEQ enriches sustainability media research by combining the rigor of psychological measurement with the specificity required to understand media-driven environmental narratives.

The findings also demonstrate a consistent correlation in value assessments regardless of the media's origins or the subjective evaluations previously conducted. The application of the BMEQ questionnaire appears promising, offering potential for more detailed analyses of the biocentric dimensions of media, whether during the production process or post-release. The reliability of our questionnaire is further substantiated through its comparative analysis with the widely recognized NEP scale. The observed alignment in results between the two instruments underscores the robustness of our tool, particularly in its capacity to assess non-anthropocentric values within media content. Moreover, our questionnaire offers a tailored framework that is more attuned to the nuances of media analysis and the imperative of transitioning towards a non-anthropocentric paradigm. This paradigm shift is pivotal in reshaping social imaginaries and fostering a deeper ecological consciousness.

7. Discussion

If more video game companies seem concerned by sustainable development and the desire to clearly display a green ecological positioning to meet the expectations of some of their customers (Ischenco, 2024) (Fjællingsdal, 2023). In fact, it appears that very few of them compensate for their carbon production (Earth.Org., 2024). The same goes for the film and animation industries (Scott, 2017) (Bevan, 2019) (Ravettine, 2020). In many cases it seems that green washing could be described as shallow ecology, rather than deep questioning with the desire to promote a biocentricity, which could by nature be opposed to the anthropocentric narrative expectations of their customers. If real non-anthropocentric positions exist, in the field of video games, they are often the result of individuality or small indies studios of committed and activist independents (Pais F. , 2024) (Pais F. G., 2024) (Ruffino, 2021). In the field of movies and animated movies, the analysis of our results shows that some of the block buster's clearly show a non-anthropocentric commitment. However, these successes only represent a tiny portion of the best-selling movies, and it is unlikely that they will revolutionize the paradigm of our social imaginations. If it seems important to us that the major players in the fields of interactive and non-interactive media take their responsibilities as creators of collective imaginations.

It is important to note that with the advent of social networks, social imaginations seem less collective than in the past. A growing body of research links social networks to societal fragmentation, reinforcing divisions within collective consciousness (Boyd, 2014) (Fayon, 2011) (Cardon, 2010) (Van Dijck, 2013). As digital interactions increasingly reshape societies into fragmented and tribal like structures, the necessity of reorienting collective social imaginaries toward a non-anthropocentric paradigm becomes even more pressing. This shift entails moving beyond the anthropocentric view that regards both living and non-living entities solely as resources for human consumption, emphasizing instead the intrinsic value and interconnectedness of all forms of life.

8. Materials

The questionnaire can be accessed and downloaded from ResearchGate at the following link: *https://www.researchgate.net/publication/388753101_E_Geslin_BMEQ_Non-Anthropocentric_Media_Score_Subjective_Semantic_Questionnaire.*

Additionally, it is referenced under the DOI: 10.13140/RG.2.2.19804.71042, ensuring its traceability and proper attribution in academic and research contexts.

9. Conclusion

Current interactive and non-interactive AAA media seldom offers viable solutions to the ongoing crisis by significantly influencing collective social imaginaries. In fact, these media rarely present pathways that could rapidly halt the decline of biodiversity, facilitate the adoption of sustainable democratic practices, or promote a reduction in the consumption of natural resources, all while advancing a non-anthropocentric philosophy. Achieving such a utopian vision would require, at the very least, the widespread adoption of a biocentric approach, fostering a balanced paradigm of population management that accounts for the finite nature of resources and acknowledges the intrinsic value of all forms of life.

Most contemporary media remain entrenched in anthropocentric perspectives, often reflecting societal challenges such as urbanization, dystopian narratives, and consumer culture. Some media even entertain the notion of humanity's future in extraterrestrial colonization, should the planet's ecosystems fail. This trajectory suggests that humanity could perpetuate its patterns of exploitation and consumption of both natural resources and non-human life across distant environments, paralleling the detrimental consequences we are currently witnessing in biodiversity and climate degradation. Our hypothesis, supported by numerous scholarly sources cited within this work, asserts that humanity does not have the luxury of such an outlook. Adopting a biocentric posture may be a crucial factor in addressing the necessary paradigm shift confronting our species. This transition could be facilitated through the incorporation of novel, non-anthropocentric narrative frameworks that generate new collective social imaginaries capable of redefining our future and safeguarding biodiversity. Based on our results, the subjective semantic questionnaire designed to assess the non-anthropocentric value of media appears poised to assist influential stakeholders in shaping media that promotes biocentric equilibrium.

Future research should prioritize extending the evaluation of non-anthropocentric values to other influential media platforms, particularly social networks. These platforms play a pivotal role in shaping social imaginaries, yet their growing influence has often contributed to societal fragmentation and the emergence of tribalized communities with diverging perspectives. This underscores the urgency for a paradigm shift that integrates a non-anthropocentric philosophy into the design and conceptualization of such systems. Educating system designers about the broader social imaginaries they influence is crucial to this transformation.

Given the historical shortcomings of anthropocentric approaches, tools like the BMEQ questionnaire hold significant potential for facilitating this shift. By promoting a coherent, non-anthropocentric vision, such frameworks can serve as a foundation for reimagining the future of collective social imaginaries and fostering more sustainable interactions between humanity and the natural world.

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