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Econarratives of the Anthropocene: Cognitive Sustainability and Climate Perception in Barbara Kingsolver's Flight Behavior

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Abstract: Global warming is a matter of perception rather than just a problem for the environment and decision-makers. The ecological crisis is too complex for the average person to understand as a part of their daily existence. The book *Flight Behavior* by Barbara Kingsolver will be examined in this article as an example of climate-fiction writing that can transform concept into tangible and emotionally charged experience. The process of developing cognitive sustainability will be examined through the development of Dellarobia Turnbow's understanding of the phenomena, using the approaches of eco-narratology and ecocriticism. The results show that the story's creator had no intention of directly imparting climatic knowledge. The narrative describes how the scientific message is transformed through focalization, metaphors drawn from everyday life, rural language, affective shock, and dialogical relationships between the experiences of experts and local communities. This study also shows that rural belief, economic pressure, and religion are cultural contexts that facilitate environmental discourse in addition to being obstacles to understanding climate change. This essay shifts from climate fiction as discourse to climate fiction as a storytelling process that promotes environmental awareness in the face of uncertainty when one interacts with *Flight Behavior* from the standpoint of cognitive sustainability. By exploring how literature might foster an awareness that is necessary in the Anthropocene, this work contributes to the fields of ecocriticism, econarratology, and climate fiction studies.

Keywords: Cognitive Sustainability, Econarratology, Climate Fiction, Anthropocene, Climate Action, Ecological Perception, Barbara Kingsolver, Flight Behavior, Environmental Humanities.

1. Introduction

One of the hardest subjects for modern writing to depict is the effects of climate change because they are beyond human comprehension (Bolze, 2026). Natural disasters like storms, heat waves, floods, droughts, or animal displacement are challenging to comprehend because they are the outcome of planetary changes occurring over long periods of time, distant geographical locations, scientific knowledge, and social inequality. As a result, climate change is both an environmental issue and a narrative dilemma. Although the causes and consequences of climate change typically work within atmospheric and ecological systems that are beyond human comprehension, it permeates people's daily lives through their physical and emotional experiences. The importance of literature is found in its capacity to establish a connection between the human experiences of humans and the scientific terminology of climate change. Climate fiction reframes people's perceptions of how climate change is intertwined with daily life, social interactions, moral choices, and future visions rather than merely narrating tales of how ecological devastation affects humanity (Schneider-Mayerson, 2018).

Recent research on climate fiction has demonstrated the importance of narrative in giving climate futures social and personal significance. Nikoleris *et al.* (2017) claim that literary fiction connects more localized personal



experiences to broader societal mechanisms in order to engage its audience with climate change issues. Schneider-Mayerson *et al.* (2020) supported this idea by showing that, although these impacts can alter over time, environmental fiction can influence readers' thoughts and feelings toward climate change. In this way, these studies change the focus of climate fiction to a broader framework of climate communication rather than only talking about the issue of climate change. The significance of narrative form in raising readers' and characters' awareness of climate change, however, is a significant literary subject that still needs to be investigated.

In the context of this study, cognitive sustainability refers to the potential of narrative to sustain, alter, and ethically invigorate ecological understanding in the face of uncertainty, psychological suffering, cultural contestation, and scientific complexity (Yeoman, 2021). The idea does not make a general reference to environmental consciousness. It especially refers to the interpretive effort that narratives do to realign ecological experience without turning to emotional wonder, denial, or helplessness. In this way, it is a crucial challenge for the Anthropocene since people need to learn how to comprehend the environment that is both incorporated into human existence and beyond their immediate perception. Because they give this cognitive effort structure, narratives are important. Veland *et al.* (2018) claim that tales influence human understanding and enable the possibility of future transformations. In the same direction, Van der Leeuw (2020) highlights that stories can both validate prior understanding and present fresh possibilities for human-nature interactions. By extending the aforementioned methods, it can be proposed that Flight Behavior not only provides information regarding climatic change but also illustrates the cognitive processes needed in comprehending it.

Because it tells the story of climate disruption from the perspective of a young Appalachian woman named Dellarobia Turnbow, this novel by Barbara Kingsolver is particularly appropriate for this inquiry. For her, the invasion of displaced monarch butterflies initially represents freedom, beauty, a miracle, and even heavenly revelation. Eventually, the same occurrence is recognized as an indication of ecological imbalance. This shift in perspective is exactly where this novel's significance lies. Climate change is not well understood in Dellarobia. Before she recognizes the butterflies as indicators of a world in turmoil, her learning journey starts with wonder, misunderstanding, divine revelation, household comparisons, doubt, discourse, and emotional agony. A straight line from ignorance to awareness is not always implied by this transition. In reality, what we see is an ecocognitive shift in which a normal mind becomes sufficiently disrupted to rearrange its thought processes.

When it comes to examining how climate is portrayed in modern novels, the literature that has already been written about Flight Behavior has been extremely informative. Using the Anthropocene eerie perspective, Mohajeri (2024) illustrates how uncommon weather causes mental discomfort that may lead to acts for the environment. Environmental ethics, ecological consciousness, climate fear, and the significance of symbolism in relation to the migration of monarch butterflies have all been examined in other research. Although these methods have shown great value, they are primarily concerned with the depiction that occurs in the book in question. It is important to concentrate on the technique that has enabled the writer to produce such an ecological story.

Both ecocriticism and econarratology served as inspiration for this study's underlying theories. While the latter concentrates this breadth on the issue of narrative forms as mediators of information about nature, the former provides the broader scope required to address the relationship between literature, environment, and ecological ethics. The work of Tian & Wang (2022), who create the concepts of ecosemiotics and biosemiotics that take into account human-nature interactions within the context of sign-based relationships between organisms, surroundings, and culture, informs both theories. The examination of Environment and Narrative: New Directions in Econarratology by Ameer (2022) illustrates the growing significance of the conversation between environmental and narrative studies. This study can read Flight Behavior as a representation of environmental crisis as well as a cognitive tool for translating atmospheric change, species migration, and ecological collapse into the grammar of family, poverty, motherhood, religion, and survival because Whiteley's (2016) investigation of climate-change imaginaries emphasizes the reliance of climate fiction on expectations, estrangement, and futurity narratives.

As a result, this paper poses three important queries. The first is how Flight Behavior is used in the book to transform climate change from a scientific idea into something the reader can feel and comprehend. The second query concerns how the author use Dellarobia's point of view to filter her perception of environment through the prisms of her social status, religion, home life, and emotions. The third is how the author uses the conflict between experience and science throughout the book to establish cognitive sustainability. The shift from a theme ecocritical



approach to a cognitive-econarratological one is what makes the current analysis unique. The current article views Flight Behavior as a narrative about how the characters and readers develop the cognitive capacity to make sense of the environmental uncertainty without turning into either a scientific abstraction or a human emotional reaction, in contrast to earlier interpretations of the work that saw it as a reflection of the climate crisis. To put it another way, the experience, beliefs, and feelings must be transformed into the understanding of the anthropogenic climate change described in this book.

2. Theoretical Framework

This study falls between the fields of ecocriticism, Eco narratology, climate communication, climate fiction studies, and cognitive sustainability. The initial concept is that climate change in literary texts should be viewed as a challenge of perception, narration, and cognition rather than just an environmental or societal concern. For instance, when an ecological crisis arises in human consciousness during the Anthropocene, it typically manifests as symptoms like unusual weather, altered migration patterns, disturbed seasons, damaged ecosystems, and species relocation. These signs are apparent, but it's still unclear how they relate to more extensive climatic systems. Literary narratives have a crucial role in bridging the gap between humans and the Earth and in narrating occurrences that are incompatible with one another from scientific, geographical, chronological, economic, and affective viewpoints. In this regard, the goal of this study is not only to examine Flight Behavior by Barbara Kingsolver as an example of climate fiction, but also to show how it contributes to the visibility and understanding of climate change. The study's theoretical structure (figure 1) illustrates four disciplinary underpinnings that cross and converge on the key analytical idea of cognitive sustainability.

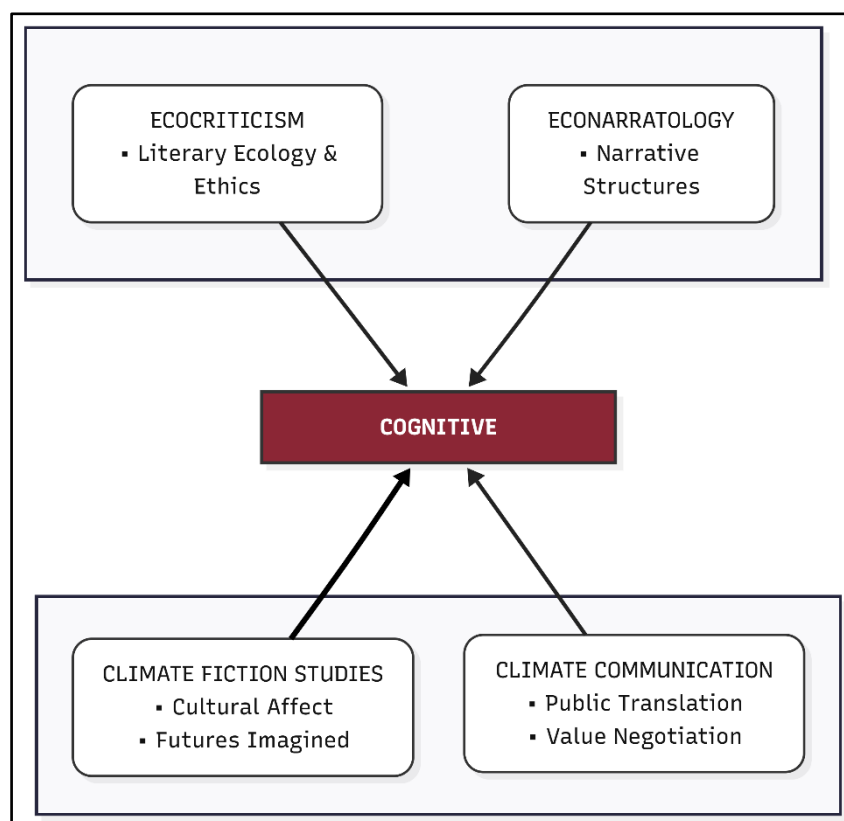


Figure 1. Conceptual frameworks

Ecocriticism is the approach that addresses the relationship between literary form, environmental imagination, and ecology in the broader theoretical framework that underpins this article. It should be noted that because Flight Behavior does not distinguish between human and nonhuman ecologies, it is a great option for an ecocritical reading. In the book, domestic life, agricultural labor, religious interpretations, science, and butterfly migration all take place on the same plane. Ecocriticism by itself, however, is insufficient to support the current investigation because the primary question this paper poses extends beyond the environmental critique found in Flight Behavior. Rather, the narrative's structure and its impact on the development of environmental consciousness

are also highlighted. Econarratology, which provides insights into how focalization, metaphor, narrative movement, characters, dialogue, and scale-shifting contribute to the concept of ecology, must thus be included in the current study as well. Ameer's (2022) talk in *Environment and Narrative: New Directions in Econarratology* is quite pertinent in this context. Building on this stance, the current article contends that Kingsolver's book transforms ecological crises into a phased cognitive recognition process.

Cognitive sustainability is the main conceptual strategy used in this study. In this context, cognitive sustainability refers to the capacity to maintain, transform, and morally actualize ecological consciousness during periods of uncertainty, emotional pain, cultural conflict, and scientific complexity (Yeoman, 2021). It goes beyond simple environmental awareness. Rather, it is an endeavor to challenge conventional wisdom, incorporate science into one's lived experience, and view ecological interdependence from an ethical perspective. Because it compels people to make links between their immediate experiences and planetary systems, climate change challenges everyday consciousness. According to Veland *et al.* (2018), narratives are essential to sustainability because they help people understand and envision change. In a similar vein, Van der Leeuw (2020) asserts that narratives play a role in shaping how people perceive the environment, human connections, and possible solutions to sustainability and climate-related problems. This essay delves deeper into cognitive sustainability in the context of literary analysis by examining how narratives depict climate change.

Reviews of literature on climate communication and climate fiction are also included in the study. Climate fiction is more than just a fictionalization of climate science. Through characters, environment, conflict, emotions, and moral quandaries, it is a cultural medium that translates climate change. According to Nikoleris *et al.* (2017), literary fiction can help readers become more engaged with climate change by fusing individual-level action and focalization with macro-level societal processes. Schneider-Mayerson (2020) also shows that people's attitudes and ideas on climate change can be influenced by environmental literature. These findings, however, are limited in scope and context-specific. The aforementioned literature supports the present paper's view that climate fiction should be examined as a cognitive and communication act in addition to a narrative medium. From this perspective, *Flight Behavior* merits particular attention because the book does not present climate science as simple instruction. Rather, before climate knowledge becomes important to individuals, it must pass through poverty, maternity, religious customs, public skepticism, media interpretation, and rural background.

Dellarobia Turnbow's restricted consciousness becomes crucial to the analysis under such a method. Although Dellarobia's knowledge is limited, domestic, local, and emotionally erratic, none of these characteristics contradict the novel's climate-based thesis. Rather, they improve it. Kingsolver makes the case that climate change does not appear to the general public as something grounded in scientific knowledge using Dellarobia's awareness. Instead, it seems to the general public as something unclear, frightening, lovely, embarrassing, religious, economically restrictive, and poorly articulated. Focalization essentially becomes an ecological tool in *Flight Behavior*, where abstract phenomena like global warming, shifting insect migratory patterns, and habitat destruction are made concrete through a child's fever, home damage, an odd-looking mountain range, and the threat to one's livelihood. The research by Whiteley *et al.* (2016) is helpful in comprehending climate imaginations in literature since it describes how climate-fiction is used to construct such imaginations through expectancy, estrangement, and future-oriented narrative.

The relationship established between the aforementioned elements through the concept of cognitive sustainability is the article's theoretical significance. Strange weather, eco-unease, and the Anthropocene weird have all been fruitfully explored in the literature on flight behavior. For example, Mohajeri (2024) argues that the unusual weather in the book creates psychological discomfort, which may then result in climate action. Although this study builds on earlier research, it focuses more on how climate anxiety gets narrativized into ecological thinking than it does on the anxiety itself. Therefore, *Flight Behavior* can be seen as a cognitive-econarratological text: a work that discusses more than just the climate problem but also how it can be understood.

3. Methodology

This study uses a qualitative single-text case-study methodology based on attentive reading. Barbara Kingsolver's "*Flight Behavior*" was selected as the study's first text to be examined because of the literary depiction



it offers of climatic perception, science, sociocultural negotiation, and ecological dependency. The article's analysis of a single climate fiction novel to demonstrate the cognitive process of creating sustainable narrative practices, rather than a survey of climate fiction in general, justifies the use of the single-text technique. The decision makes it possible to analyze Dellarobia Turnbow's shift from religious and artistic awe to eco-literacy. *Flight Behavior* is a methodologically appropriate choice because of three main reasons. First of all, the narrative sets the context of climate change within the mundane aspects of rural life, not considering the phenomenon as something that takes place in an outer world. Secondly, the knowledge of climate is set into motion through a range of elements: scientific reasoning, local tradition, economy, domestic experience, and religion. Finally, even though much criticism of the book has been focused on the topic of representation and the Anthropocene uncanny, the aspect of narrative production of cognitive sustainability is far from being thoroughly explored. One can find a valuable reference in Mohajeri's analysis of weird weather and psychological disquiet.

The analysis will follow five forms of interpretation that are interlinked: close reading, focalization analysis, motif analysis, metaphor analysis, and scientific mediation analysis. Close reading refers to a careful examination of certain scenes where ecological significance is gained through changes in perception, language, and affect. Emphasis will be placed on those instances in which Dellarobia misperceives, misunderstands, and/or re-reads the monarch butterflies. At the onset of the novel, the butterflies symbolize beauty, miracle, freedom, and revelation for her. In later sections, however, the exact same phenomenon comes to be recognized as ecological displacement and vulnerability. The above development is considered the crucial cognitive moment in the book because it represents how the narrative divides perception from cognition and, consequently, forces familiar perception to accommodate itself.

The second phase in the study consists of a focalization analysis of Dellarobia's restricted viewpoint as the interpretive device that initially misconstrues, then challenges, and finally rearranges ecological knowledge. Rather than seeing Dellarobia's restricted viewpoint as a hindrance to climate interpretation, the analysis highlights how Dellarobia's point of view is the narrative strategy that makes climate abstraction possible to experience. In other words, the emphasis here is placed on the scenes where science is rendered domestic and embodied, or localized. For example, the analogy between climate chaos and childhood fever, the description of atmospheric oddness via imagery of household experience, and the naming of climate chaos using local language are narrative strategies used to make planetary events accessible to human cognition.

Stage three looks at the motifs and metaphors in the novel. Images that recur throughout the book including those of butterflies, fever, derelict homes, unpredictable weather, mud, migration, and descending water are considered for their significance within the cognitive ecology of the book. The motifs are not merely symbols of climate change, but also signals for a reconfiguration of perception, linking personal emotion, physiological disruption, and global interconnection. The butterflies, especially, serve as a scale-shift mechanism: they move Dellarobia away from her mountain, domestic, and church community into the realm of continent-spanning migrations and degraded ecological systems. As such, metaphor is approached as an aesthetic technique by which the novel translates the complexities of climate into scenes, analogies, and recognitions.

The fourth stage focuses on mediation through science. The stage analyzes the connection between Dellarobia and Ovid Byron, taking particular note of the role played by scientific explanations as expressed through analogies, conversations, mutual trust, and ethical conflict. The role played by Ovid is that of an intermediary figure rather than one that simplifies knowledge as an expert challenging ignorant rural people. He plays the role of an intermediary, not just one that dispenses knowledge. His scientific information becomes significant only when it relates to the experiential, ethical, linguistic, and maternal knowledge possessed by Dellarobia. In this stage, it is important to consider sociocultural interpretations. This analysis focuses on the significance of rural poverty, social class, family obligations, gender roles at home, religious language, the role of media, and institutional skepticism in the consumption of climate knowledge. In other words, these phenomena do not just provide the necessary background; they are the very parts of the novel's narrative ecology as they define the interpretations of ecological signs as well as make environmental responsibility nearly impossible because of material limitations. Hence, in contrast to the common opposition of science and rural ignorance, the analysis takes into account the mediations required for making climate knowledge understandable, resisted, and morally relevant.



The interpretation is constructed through triangulation theory. Textual observations drawn from the novel *Flight Behavior* are placed within the context of ecocriticism, econarratology, sustainability stories, climate fiction, climate communication, and the uncanny Anthropocene literature. Triangulation theory is employed here to help reveal the process by which the novel creates the ecological cognition, rather than applying a ready-made theoretical paradigm to the novel. All arguments are supported by textual and theoretical references. This ensures that the analysis does not become impressionistic while retaining its interpretative depth, which is crucial for literary criticism. There is one evident drawback to the study. As a result of concentrating on only one primary text, the results obtained are not applicable to climate fiction in general. Nonetheless, it is possible to consider this factor as a methodological advantage, since it enables the author to show exactly how one major climate novel develops ecological cognition via narrative techniques. Future studies can develop the concept of cognitive sustainability by comparing other climate fiction texts from different regions, in different languages, and in various ecological situations. In the current paper, the approach helps formulate the assumption that *Flight Behavior* plays a crucial role in training human perception to shift from individual experience to the interconnected planet.

4. Results and Analysis

Flight Behavior demonstrates that Kingsolver's climate narrative does not function through direct environmental education (Hansson, 2020). Its power is found in its slow remapping of perception. Climate change does not come into the novel as an accepted fact but rather as a confusion, beauty, horror, and societal disagreement. Through Dellarobia Turnbow's discovery of the displaced monarch butterflies, Kingsolver provides the reader with an example of how ecological knowledge can be created, fought against, translated, mediated, negotiated, and finally understood. The critical reading finds that five intertwined processes are responsible for cognitive sustainability in *Flight Behavior*. They include disturbance of perception, translation through focalization, mediation through science, negotiation through society and culture, and understanding of ecological interconnectedness. These processes prove that Kingsolver is writing about the experience of the climate crisis, but she is also staging how challenging it is to comprehend such an event when one encounters it in domestic, spiritual, financial, and social contexts. Figure 2 illustrates Dellarobia's cognitive development through five phases.

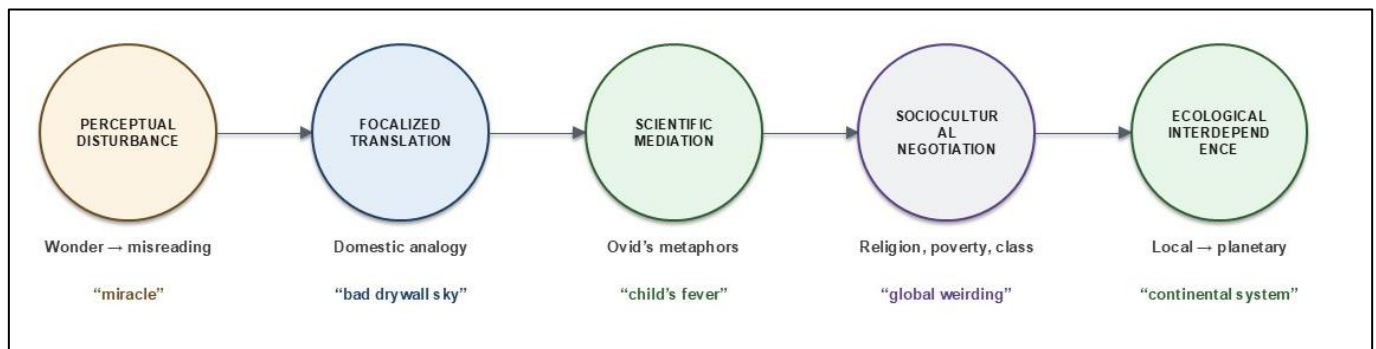


Figure 2. Five-Process Cognitive Sustainability Model in *Flight Behavior*

4.1 Cognitive Sustainability as Gradual Perceptual Reorientation

The emergence of Dellarobia's eco-consciousness is neither immediate nor guaranteed. The novel eschews the straightforward narrative trajectory of ignorance leading to illumination. The emergence of perception depends on misperception, emotional projection, partial reorientation, and uncertainty. It is vital for cognitive sustainability in that ecological knowledge cannot be conceived in terms of having the right information. Rather, it involves the ability to be intellectually and morally receptive while previous understandings are challenged. The conversion of Dellarobia can thus be understood as ecocognitive adaptation. She does not just receive knowledge about the climate but has to rethink her conceptual frameworks in order to make sense of the world around her.

Dellarobia's initial response to the mysterious orange mass of butterflies on the mountain relies upon what knowledge and language she has at her disposal. The phenomenon is not immediately recognized as part of an ecological crisis; it is understood through beauty, awe, dread, religiosity, and emotion. Her reading of the occurrence is thus not merely empty or naive but influenced by the cultural, religious, and emotional discourse that constitutes

her world. In taking the event as a vision or a message from God, the butterflies take on a personal and religious significance rather than ecological significance. What Kingsolver wants to say here is not that such discourses are invalid, but rather that they have failed to provide Dellarobia any framework for comprehending the planetary disruption she witnesses.

The recognition that these are butterflies on which Dellarobia is staring is a perceptual breakthrough, but this does not qualify as an ecological epiphany just yet. As Kingsolver (2012) asks "how had she failed to see them?", there is something far deeper revealed by this than mere amazement at what she saw. Perception was unstable; although the object was physically there, its significance was not because her cognitive apparatus was not equipped to make sense of it. Here the narrative makes a separation between perception and cognition, which is critical for climate fiction, as the climate crisis manifests in signs that have some systemic relevance but their significance can easily be overlooked. The concept of the uncanny in the Anthropocene as discussed by Mohajeri (2024) is quite relevant here as the uncanniness of the phenomenon is in disturbing our familiarity with nature.

As the story unfolds, Dellarobia's interpretation moves from awe of aesthetics to concern for ecology. Once she realizes that the butterflies have ended up in the wrong spot, there is a fundamental transformation in how the event is to be interpreted. Beauty is seen as an indication of disturbance. Wonder gives way to unease. Instead of being merely a site of miracle, the mountain turns into a symbol of biological displacement. This transformation is important since the novel refuses to indulge in environmentalist sentimentality. While the butterflies are indeed beautiful, the story increasingly reveals to Dellarobia and the reader that behind that beauty lies disaster. With the association of butterflies with destruction, damage, and vulnerability, the novel transforms aesthetic awareness into systematic perception. Aesthetic crisis begins with beauty, but it gains its ethical dimension by situating it within the broader biological context.

In this way, cognitive sustainability comes into play. Dellarobia does not immediately give up on her previous system of meanings. Instead, she inhabits it, tries it out, and slowly stretches it. The challenge she faces in this development is that of accepting that her initial readings carried emotional truth, though not an ecological one. In this way, the novel does not portray ecological consciousness as a straightforward progression from false consciousness to scientific fact. Instead, personal emotion, religion, the senses, and science are forced to coexist. Climate change fiction becomes important here in part because it allows a portrayal of this struggle that scientific literature cannot.

4.2 Narrative Focalization as an Ecological Strategy

The second important outcome of the analysis is that the focalizing point of Dellarobia provides the ecological approach in the book. Climate change in the novel is not explained through a scientific perspective. Instead, Kingsolver describes the phenomenon through the eyes of a woman who grows up in poverty in the countryside and lives as a wife, mother, churchgoer, poorly educated person, and a housewife. This method is not a drawback of the literary technique but rather the way to make an abstract topic tangible. The first comparison of the sky as a "poor job of drywall" is crucial in the sense that "the domestic context of this metaphor makes it an appropriate tool to convey the author's message and idea" (Kingsolver, 2012). On the literal plane, it is a home image. On the figurative plane, it accomplishes a significant task within the narrative framework. It transforms the strange into something recognizable from the sphere of the housewife's knowledge. Dellarobia cannot articulate climatic anomalies in scientific terms at first, but she has her own language of construction, repair, lack, and economic necessity to understand the natural world. Here the novel reveals the fact that ecological awareness starts with an analogy rather than with a scientific terminology.

Focalization of this kind is characteristic of the entire novel. Dellarobia's queries related to weather, aridity, cold, and irregularities in the seasons demonstrate that Dellarobia is an active observer. Despite being linguistically limited and uneducated, Dellarobia is capable of reasoning using data at her disposal. It is precisely this linguistic limitation that adds to the relevance of Dellarobia's observations. Instead of ridiculing Dellarobia's fragmented understanding of the problem at hand, the text represents it as part of developing climate consciousness in ordinary circumstances of rural existence. In terms of climate fiction studies, Flight Behavior provides an example of an alternative to privileging ecological understanding among individuals who have been previously exposed to education.



The novel contributes to a more empathic way of discussing environmental issues by representing knowledge as a situated practice rather than mere instruction.

The use of the term “global weirding” is especially significant here, since it helps Dellarobia to render climate change speech act in her own society (Kingsolver, 2012). It does not have such scientific precision as the concept of “global warming”, but still communicates effectively. It names the sense of disruption of climate without the necessity to understand it scientifically. Furthermore, the replacement of “warming” by “weirding” also suggests an understanding of climate change in the novel as something more than global increase in temperature. This phenomenon is represented as something strange and disruptive for people. As has been stated in climate communication research, storytelling helps to make global climatic processes meaningful when related to individual experiences (Nikoleris *et al.*, 2017). In the book by Kingsolver, it happens through focalization.

It can therefore be said that the perception of Dellarobia acts as a cognitive bridge. It is the limitation in Dellarobia’s cognition that is responsible for the creation of the means by which ecological meaning must be established. In this novel, the audience shares in the struggle involved with mediation, not because they receive information about climate science as an external explanation, but because they are faced with the problem of reconciling scientific fact within their understanding of how a life can be conducted under monetary concerns, familial obligations, physical labor, religious beliefs, and societal expectations. This explains the relevance of focalization to cognitive sustainability, since it maintains sustainability through grounding cognition on personal perception. In addition, the focalization approach prevents the novel from being didactic. Kingsolver is not simply conveying to the reader the idea that global warming is real. Rather, she forces the reader to walk through the tedious steps that are necessary to see it in this manner. Dellarobia’s focalized consciousness as a bridge between planetary climate systems and local domestic experience is shown in Figure 3.

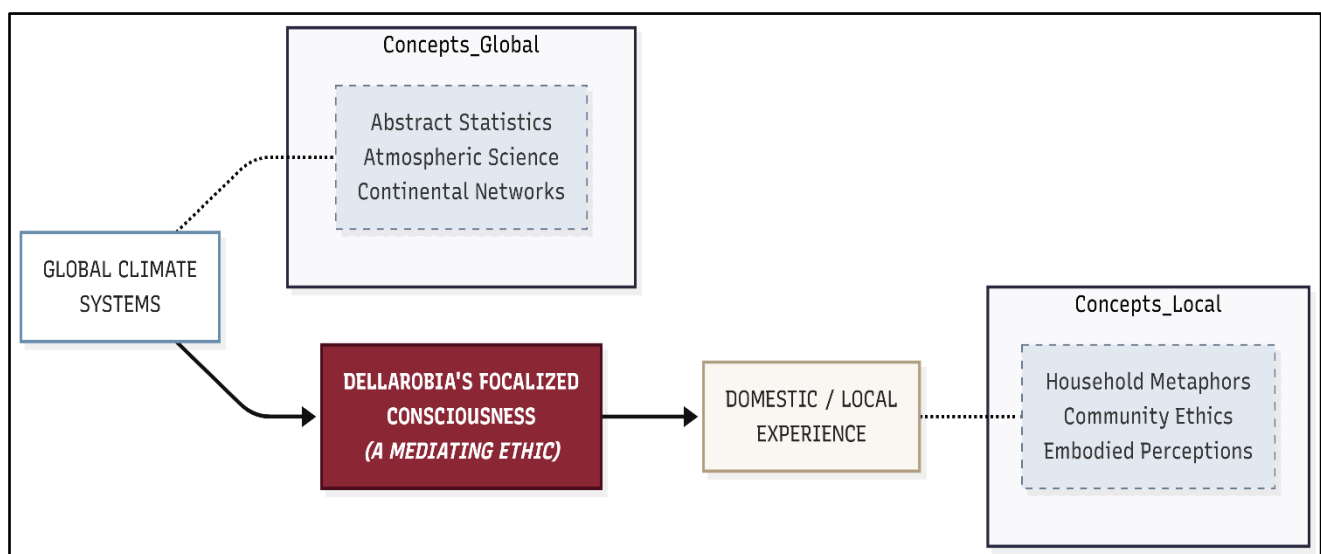


Figure 3. Narrative Focalization as Ecological Bridge.

4.3 Scientific Mediation and the Translation of Climate Knowledge

In the novel, Ovid Byron holds an important place; however, it would not be reasonable to interpret him as a mere representation of science, who comes to solve the problem of ignorance in the countryside. Such interpretation would deprive the novel of its social and narrative complexity. Rather than being a scientist, Ovid plays the role of mediator whose knowledge becomes applicable only through images and analogies related to Dellarobia’s experiences. Thus, in this novel climate knowledge proves to be relational, and requires trust, affect, and context in order to change perception.

The “child-fever” analogy provides an excellent example of such mediation. When Ovid asks Dellarobia to imagine how a child feels having her body heat elevated by just two degrees, the data presented in climate science become emotionally and physically comprehensible (Kingsolver, 2012). In addition to the simple act of providing

easier data comprehension through analogy, the metaphor alters the meaning of the information in terms of moral values. An increase in a mere degree or two now involves issues of care, vulnerability, and risk. Dellarobia knows about children, fever, and fright. From her personal experience, she gets a better understanding of planetary climate instability. Figure 4 presents this process of scientific mediation.

It is at this point that the importance of the narrative is crucial as far as the argument of the article is concerned since cognitive sustainability requires more than just the transmission of facts; cognitive sustainability also involves the creation of relational meaning between facts and experiences. The analogy of fever in children makes sense because it preserves the knowledge that already exists within Dellarobia. It does not supplant domestic experience with science; rather, it builds on domestic experience as the necessary condition for science to occur. In this respect, Kingstovler's narrative is consistent with climate communication studies, which acknowledge that climate knowledge becomes socially meaningful in relation to values, identities, and experience (Schneider-Mayerson *et al.*, 2020).

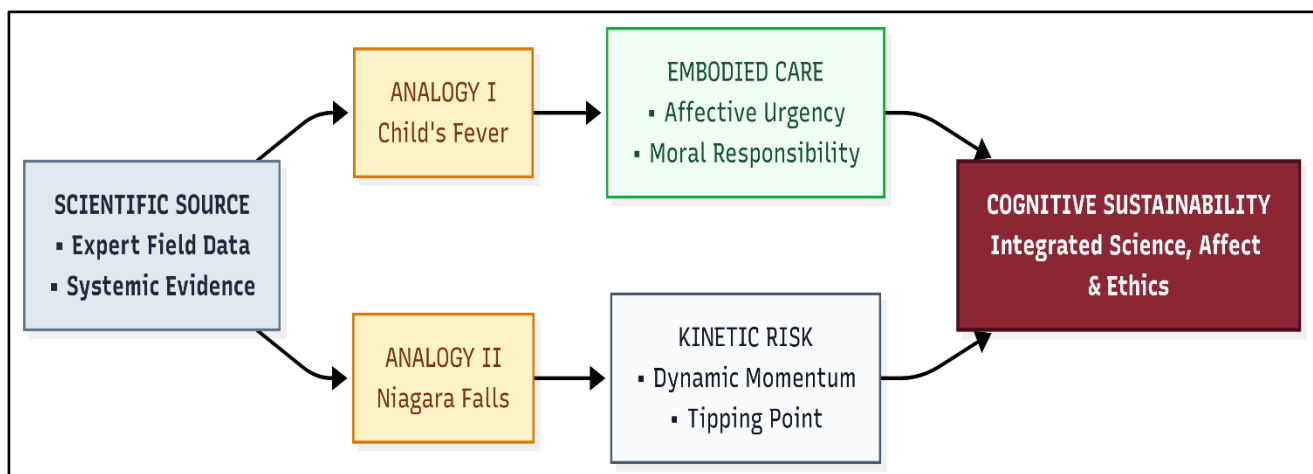


Figure 4. Scientific Mediation Model

However, the role of Ovid's metaphor about Niagara Falls differs. With the help of his metaphor, where he compares humans with those who travel on canoes along the top of Niagara Falls, Ovid brings the concept of climate tipping point alive. The metaphor implies movement, danger, and limited time available. Furthermore, the metaphor goes beyond passivity. The notion of drifting implies that catastrophe does not necessarily occur when someone deliberately acts against nature; it can also emerge due to passivity and the inability to act immediately. It is one of the most thought-provoking moments in the novel since everyday delays can lead to global catastrophes.

But the novel fails to turn science into an ethical dictate. In other words, although Ovid's reasoning provides Dellarobia with information, it does not necessarily prescribe how to act on it. This makes a great difference. While science may reveal the nature of an ecological crisis, ethics presupposes interpretation, responsibility, and choice. Consequently, the novel steers clear from both anti-science relativism and uncritical science. The former would mean endorsing the idea that every kind of reasoning is just as good as any other, while the latter would equate facts with the solution to the problem of acting on them. Cognitive sustainability occupies a position between these two extremes. This is the reason Ovid's connection with Dellarobia is vital for the structure of the novel. His purpose is not simply to educate her about anything. He helps her create an environment in which she herself interprets her surroundings. As a result of the discussions between the two characters, the butterflies move beyond being mere phenomena, sights, or even pests. Instead, they come to belong to a broken eco-system. Dellarobia's understanding of the situation, however, is still her own. The pedagogical strength of the novel resides in the equilibrium thus achieved.

4.4 Sociocultural Mediation of Climate Knowledge

A discussion of the depiction of rural Appalachia in this novel is one of the most significant contributions of this novel to the study of climate fiction literature. In her novel, *Flight Behavior*, the author neither characterizes climate scepticism as simple ignorance nor idealizes local culture by making it ecologically aware. Rather, she depicts that environmental meanings are made through religious beliefs, poverty, gender, familial duties, distrust in authority, and insecurity of livelihood. The reception of ecological crisis is always a socially situated process; individuals

understand their environments within existing social structures. In the case of this community, religious interpretation is clearly illustrated in this context. According to Cub, "This is a miracle. She had a vision of this" (Kingsolver, 2012), which means that the butterfly incident is first interpreted through a religious prism as opposed to being seen from the perspective of ecological displacement. As Pastor Ogle says about the incident being "a miracle," this means that the religious interpretation is legitimized by the community and its institutions (Kingsolver, 2012). However, while the religious interpretation of the butterfly incident could be regarded as an impediment to climate change awareness, Kingsolver's novel reveals that there is much more to religion than merely obstructing the recognition of ecological change. On the one hand, religious interpretation of climate change may lead to postponement of ecological perception due to the translation of biological change into a symbolic context. On the other hand, religious interpretation may be turned around and contribute to environmental awareness; that is, Pastor Ogle's statement about "God own[ing] these hills" and about arrogance regarding the fact that creation is considered "mere wealth" (Kingsolver, 2012).

Economic coercion also plays a role in shaping the community's attitude toward their environment. Bear Turnbow's attitude toward the butterfly situation: "Whatever the hell that is, it can't be a damn bit of good for logging" (Kingsolver, 2012). This captures the material perspective of judging and evaluating nature for what it represents economically. The mountainscape is not primarily about being an ecologically sensitive environment to Bear Turnbow; it is a means of subsistence and a property for economic gain. In no way is he a villain, but rather, his attitude shows how complex it becomes to engage in environmentalism when there are socio-economic realities. The author does not dissociate climate awareness from class coercion. There is a cognitive burden created by rural poverty. People whose livelihood is at stake in times of climatic change may not have the resources to speak and engage in the kind of climate conversation required by environmentalists.

Local skepticism about scientific authority must also be considered in this light. Dimmit Slaughter's sardonic comment, "There you go, science foundation. Why don't you do some dialysis on that and see what it died from?" (Kingsolver, 2012), is not an indication of mistrust in the scientific process itself, but also in the institutions and outsiders who represent them. Skepticism is not simply a lack of intellectual capacity. Instead, it represents a social divide that exists between rural society and expert systems. The importance of this message lies in the fact that climate knowledge cannot be effective when it is presented to communities as external and authoritative, but lacking in cultural credibility. This is essential for climate communications as scientific knowledge alone is insufficient in transforming into social knowledge. Nikoleris *et al.* (2017) provide strong support for this idea in their research on climate futures, which emphasizes how narrative gives social meaning to climate change experiences.

Dellarobia's cognitive development relies upon her ability to negotiate these social pressures without rejecting them altogether. Dellarobia does not gain her ecological awareness through a separation from the language of her community. She gains it by putting her community's language up to the test. This is one of the most realistic aspects of this work. Awareness does not come about through a simple replacement of one belief system for another. Rather, awareness comes out of conflict. Domestic knowledge, religion, science, and economic concerns all continue to coexist and compete with each other. Cognitive sustainability, in the context of the story, is the ability to live in this kind of conflicting state until awareness becomes more responsible. Figure 5 illustrates the process by which knowledge about climate change is mediated through the rural Appalachian society of Flight Behavior.

4.5 Narrative Ecology and Planetary Interdependence

Another crucial outcome of the analysis concerns how Kingsolver portrays climate change as a system of interdependence rather than an isolated phenomenon. At first, the displaced butterflies emerge as a spectacle confined to one specific locality, namely the Appalachian Mountains, but later in the narrative their significance transcends the confines of both geographical space and the species in question. In fact, such a transformation is essential for the ecological framework in which the novel is set. What it accomplishes is teaching Dellarobia to transition from local appearances to planetary relations.

The description of monarch butterfly migration as a "continental system" is particularly relevant insofar as it involves a significant shift in the scale of understanding (Kingsolver, 2012). Although the creatures themselves are small and vulnerable, their continued survival requires complex ecological networks. In that way, Kingsolver uses the



example of the butterflies to illustrate the notion of interdependence. What Dellarobia perceives as local land acquires a much larger meaning, being a part of a wider ecological path dictated by climate, weather, forest destruction, and many other factors. In that sense, this represents another step toward cognitive sustainability.

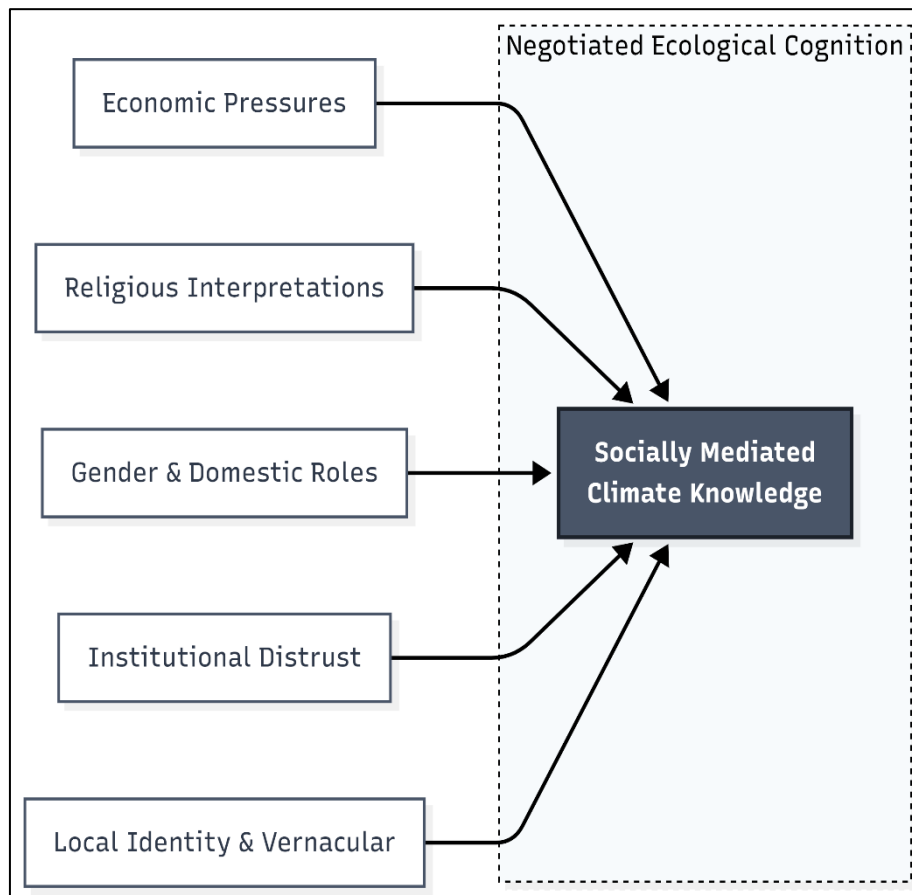


Figure 5. Sociocultural Negotiation Network

The book emphasizes the systemic nature of these issues through its depiction of logging, mudslides, and destruction of habitats. As Dellarobia learns that logging causes mudslides in Mexico, she realizes that the issue of environmental damage expands beyond just her local environment (Kingsolver, 2012). Logging, even on a smaller scale, has far-reaching implications in the long run, as it can impact the soil, habitat, migration, and communities elsewhere. This makes climate change such a hard cognitive concept because both the causes and effects occur at multiple points in time and space. The author's writing technique is therefore an attempt to construct relationships step-by-step and help the reader expand his or her perception in tandem with Dellarobia. This corresponds with sustainability scholarship that treats narrative as a means of making complex environmental relations understandable (Veland *et al.*, (2018).

This makes Flight Behavior enact ecological thinking instead of declaring it. The novel's form binds isolated occurrences into relation. Weather anomalies, butterfly migration, poverty in the countryside, religious explanations, science, deforestation, media scrutiny, and family discontent do not stand in isolation from one another as separate narrative threads. Instead, they come together to constitute one coherent ecological landscape. This is why the novel may be considered a "econarrative of the Anthropocene." Its form encourages relational perception. The novel teaches readers that the ecological crisis we face cannot be located elsewhere or deferred to some distant future point in time. The findings support the claim made in the article, namely that cognitive sustainability in Flight Behavior depends on narrative form. Dellarobia's metamorphosis is important not in how it makes her into an exemplary environmental subject. It does not do so. What is significant about Dellarobia's journey is how Flight Behavior depicts the challenge of coming to see the reality of the climate crisis in a world that is constrained. It is Kingstler's skill as an author that enables her to show that challenge in narrative terms.

5. Discussion

It is clear from the analysis of the book *Flight Behavior* that Kingsolver's writing is more than just a conceptual portrayal of climate change. Her development of a conceptual framework for comprehending climate through cognitive, affective, and cultural processes is what makes her book significant. Throughout other words, Kingsolver demonstrates throughout the book that ecological knowledge cannot be created just from scientific data. For climate knowledge to be morally significant, it must pass via processes like perception, language, beliefs, social position, emotional disturbances, and social trust (Reid, 2019). In climate-fiction research, this finding becomes more important since it helps change the emphasis from environmental information to narrative method. Climate fiction becomes a cognitive process in the book *Flight Behavior*, where readers gain an understanding of ecological meaning through changing perceptions.

Narrative focalization is another significant implication. From Dellarobia's perspective, the focalization is constrained, yet this constraint is advantageous. Kingsolver integrates the enormous scope of climate science into the scale of domesticity by concentrating on Dellarobia's mind. This is a required narrative mediation, not a reduction of climate complexity. Insofar as climate science is portrayed through abstract numbers, far-off disasters, and future scenarios, it may frequently cause issues for the general public. In order to address this issue, Kingsolver places climate change within the framework of a consciousness characterized by motherhood, poverty, religiosity, marriage, and physical labor in rural areas. In this way, Dellarobia's simple language links global warming to a community's financial struggles, a shattered home, sick children, and moving mountains. This suggests that stories help people make the connection between their experiences and their climate futures (Nikoleris *et al.*, 2017). In particular, the current work makes a contribution by contending that focalization might be an ecological practice.

The field of econarratology might benefit greatly from such an approach. Econarratology addresses narrative strategies that make ecological relationships understandable in addition to ecological and environmental concerns (Donly, 2017). Focalization, metaphor, analogy, and conversation are techniques that comprise narrative structure and are not limited to literary form, as demonstrated by the case of *Flight Behavior*. They serve as cognitive tools that aid in the novel's comprehension of the surrounding circumstances. Dellarobia transitions from appreciating beauty to acknowledging disruption, displacement, and interconnectedness. The significance of the butterflies changes with each step. The author thus demonstrates that story formats, as opposed to explanation alone, are a more effective way to organize environmental cognition. The book serves as proof that the environmental humanities must take narrative structure into account while examining ecological ideas (Ameel, 2022).

Second, this book explores the link between science and human experience. Although Kingsolver does not discount scientific authority, her protagonist learns a lot from it. However, Kingsolver believes that science is insufficient. Science is only effective when it is mediated by vulnerability, trust, and analogy. Niagara Falls transfers risk from the system level to a more immediate knowledge of movement and peril, whereas child-fever transforms an elevated number on a thermometer into a moral dilemma of caring. These illustrations highlight the ethical power that arises when science permeates one's home, body, and mind. Literature has the power to influence attitudes and ideas about climate change, according to researchers studying climate communication (Schneider-Mayerson *et al.*, 2020). But Kingsolver provides some clues into how such molding might occur in her book.

It address another common mistake in the conversation regarding rural culture and science. An oversimplified view would characterize the community as ignorance and Ovid as rationality. This form of opposition is refuted in Kingsolver's work. It acknowledges, on the one hand, that rural culture may reject scientific interpretation. However, it also clarifies the causes of this kind of rejection. The way that climate knowledge is received is influenced by poverty, mistrust, spirituality, and a lack of social integration. Furthermore, the community's response cannot be rationalized as denial. Actually, cultural mediation should be used to understand this response. This is the novel's second major contribution to climate fiction. The separation of ecological consciousness from its social contexts is avoided in Kingsolver's work. Not everyone is equally informed about climate change. Climate knowledge is mediated by class, education, gender, religion, and financial instability. Therefore, cognitive sustainability is both a socially conditioned phenomena and a personal capacity.



Religion and environmental ethics are the subjects of the third implication. The butterfly phenomena is first described in the book as a miracle using religious terminology. However, because it humanizes and spiritualizes the phenomenon—which must also be understood as an indication of biological imbalance—this could hinder the growth of ecological thought. However, the book does not see religion as impeding the advancement of ecological theory. Rather, religion turns into a vocabulary that facilitates the development of environmental humility later in the book. As long as the notion of creation is perceived not as something belonging to humanity, the religion becomes the possible source of environmental ethics. Thus, the book avoids creating a dichotomy between science and religion in its analysis. The fourth implication focuses on emotion. Facts are not the only source of Dellarobia's ecological consciousness. It manifests as discomfort, embarrassment, amazement, fear, concern, and uncertainty. She finds the butterflies repulsive since they are both lovely and awful at the same time. A key component of Kingsolver's environmental argument is this conflicting effect. The book would have been didactic if the butterflies had only been a source of tragedy in the narrative. The book would have been sentimental if the butterflies had only been a source of wonder. In Kingsolver's work, both interpretations are balanced. The result is an affective ecology in which ecological knowledge can be derived from affect. However, Kingsolver's book warns against relying solely on emotion. Awe must give way to inquiry. Fear must turn into accountability. It is necessary to consider beauty in the context of devastation.

The concept of cognitive sustainability can be particularly useful in this situation. Optimism and environmentalism are not synonymous with cognitive sustainability. When the outdated interpretive frameworks fail, it is the capacity for thought. This requirement is aptly demonstrated by the character of Dellarobia. She must accept that her first realization was inadequate, that her household is unstable, that there are few stories from her community, and that the ecology is incredibly interconnected. Because climate thinking is challenging, the story does not offer a smooth transition. Resistance, humiliation, rage, incomplete understanding, and acknowledgment are all necessary. Fifthly, there is the issue of scale. Climate change is a hard story to tell as it ties both the personal and the planetary. *Flight Behavior* works through this challenge through the monarch butterflies, which act as the scale shifters. They are small and therefore able to fit into immediate perception, yet their migration is within continental scales. It is through these butterflies that Dellarobia's mountain local area connects to Mexico, global warming, changes in habitat and biological disturbance. Scale shift from local to planetary is at the heart of ecological interdependence. What the novel teaches is that there is no place that is purely local. Farm, forest, church or even home is isolated in any way, for there is an environmental system connection beyond its local setting. This is why narrative matters for sustainability: it can make dispersed relations visible without reducing them to abstract explanation (Veland, 2018).

Indeed, the research paper makes a valuable contribution to the existing body of literature on *Flight Behavior*, by shifting attention from the environmental discourse in Kingsolver's novel to that of perception. Previous studies that analyze the uncanniness of the Anthropocene period rightfully point to the unsettling strangeness of changing weather and displaced ecology (Mohajeri, 2024; Thieme, 2023). The current article relies on this notion, but tries to understand how uncanny phenomena influence human perception. In the novel under analysis, uncanny nature is not just an impression or theme. Uncanny nature is that element that prompts Dellarobia to change her mental map. The text also enriches climate communication through its demonstration that an effective climate narrative is not just an instance of science made accessible to people. It is rather a relational space where science, emotion, and culture can meet. Ovid's science is important, but no less so are Dellarobia's metaphors, maternal wisdom, poverty, church world, and longing for something else. The power of the novel is seen in how it allows for the emergence of climate awareness out of such a complex context. That is why *Flight Behavior* is presented as a narrative framework for cognitive sustainability in the text. The image of the ideal climate communicator is not that of a person separate from culture and emotion.

This mediating role is what gives literature its higher significance in the Anthropocene (De Cristofaro & Cordle, 2018). Fiction explores how these answers are given meaning, rejected, misinterpreted, embodied, and ethically assessed, whereas science offers scientific explanations of climatic systems. These two kinds of information are combined in Kingsolver's book. She accepts science, but she also understands that people are more than just numbers and statistics. Families, tales, responsibilities, concepts, and beliefs all contain them. For this reason, the present research proposes that *Flight Behavior* is an Anthropocene econarrative. This type of work performs ecological thought through narrative form. In actuality, the storyline involves more than just Dellarobia's transition



from ignorance to consciousness. Instead, it entails rearranging how home, species, climate, labor, belief, and world processes are related to one another. The central idea of the novel's intellectual effort is this reconfiguration. Climate change is no longer an external topic for debate and reflection. Rather, it has become a part of everyday life. As a result, this article's contribution can be summed up as follows.

6. Conclusion

Another example of eco-fiction that illustrates climate change is *Flight Behavior*. But in doing so, it seems reasonable to argue that the novel's central idea—the one that distinguishes it as a work of fiction—is how it portrays cognitive sustainability. Dellarobia Turnbow's developing ecological perception of her surroundings demonstrates how environmental consciousness emerges against a backdrop of uncertainty, misidentification, emotional anguish, culture, and scientific knowledge. For this character, climate change is not an abstract issue; rather, it takes on significance as it begins to impact her personal life, rural economic operations, religion, motherhood, and language. The primary innovation of this paper is the transition from ecocritical readings of *Flight Behavior* to cognitive-econarratological interpretations of its textuality. The decision was made because it became clear that although the book deals with a number of ecological issues, such as species relocation, climate instability, and the interconnectedness of nature, its true relevance is in demonstrating how these difficulties came to be recognized.

The present investigation shows that Kingsolver rejects a straightforward division between rural cultures and science. The novel's scientific explanations are crucial, but they work best when they translate science into terms of parallels, affect, trust, and social environment. Similarly, religion, poverty, and skepticism are seldom portrayed as inflexible barriers to learning about ecology. They are presented as interpretive frameworks that facilitate the negotiation of environmental consciousness. This subtlety gives the book essential power and makes it applicable to climate communication in divisive communities. The current paper makes the case that climate fiction is not limited to increasing environmental awareness in order to promote cognitive sustainability. Rather, climate fiction can enhance perceptual abilities and maintain ethical awareness of the interdependencies between human existence and planetary ecosystems. The study's conclusions can be applied to other cases of climate fiction, even if it was limited to a single source material. In any event, a detailed examination of *Flight Behavior* shows how important the story form is to the process of creating climate perception.

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Does this article screen for similarity?

Yes

Conflict of Interest

The authors have no conflicts of interest to declare. There is also no financial interest to report. The author certifies that the submission is original work and is not under review at any other publication.

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