

Thermoception in the Arctic Film: Knut Erik Jensen's "Aesthetics of Cold"

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Introduction

This essay conceptualizes thermoception (our sensory system for temperature perception) on the basis of experiential film aesthetics through an analysis of cinematic perception of temperature. I propose that thermoception allows spectators to perceive temperature in/through audiovisual media such as film without skin contact via the thermal energy from the diegesis of the film. These experiential film aesthetics, which are realized in Knut Erik Jensen's aesthetics of cold, describe film not only in terms of its pictorial and compositional dimensions but also at the intersection between stylistic elements and human perception through sensory modalities beyond the classic five senses, specifically, thermoception. I am pursuing the following questions: can temperature be perceived in an audiovisual medium such as film? Can our thermoception actually have a direct connection to the perception of temperature through audiovisual means? In other words, what indicates that spectators can perceive the temperature represented in the material world of a film? My examination of these questions comes from my analysis of some of the paradigmatic scenes from Jensen's 1993 Arctic film *Stella Polaris*.

Jensen's aesthetics of cold result in a shift from a more conventional representation of landscape through full-scale and panoramic shots to a mode of small-scale representation that stimulates affective and immersive engagement with the ecology of the cinematic Arctic space. Although Jensen's aesthetics of cold permeate his *œuvre*, I limit this analysis to his most acclaimed feature film, *Stella Polaris*,¹ which contains representative examples of the three axes that I use to discuss the experiential aesthetics of film, namely, perceptual affect, character mediation and inferential knowledge/perceptual inferences. My approach to the underlying arguments and questions of this essay is based on a dialogical intersection between elements of film style from *Stella Polaris* and the use of scientifically informed arguments that rely on multisensory studies to argue that the cinematic experiences of cold and of Arctic ecology are neither perceived in a disembodied fashion nor merely imagined but rather occur within the realm of thermoception and the spectator's perceptual experience of film. In addition to analyzing some of the film's stylistic elements and the neural correlates

of spectators that indicate a capacity to perceive temperature through an audiovisual medium such as film, I also seek to redefine the conventional understanding of thermoception as a sense. My overarching goal is to argue that spectators can access a thermoceptive film experience through sight and hearing and to describe how Jensen, who is committed to filming in the Arctic regions of continental Norway (Finnmark) and the Svalbard archipelago, has employed the region's temperature, climate and other ecologic elements to create a unique film aesthetics and authorial voice, taking advantage of spectators' perceptual capacity to create a sensorially appealing Arctic materiality through thermoceptive cinematic immersion.

Knut Erik Jensen

Both Jensen's fictional and documentary films have unconventional approaches to narrative structure and are stylistically experimental, especially at the level of sound and color design and camera work. The depth to which he explores cold as a sensory element of northern Norway and his ability to translate it into a filmic style through different levels of spectator engagement lead me to claim that Jensen's approach represents an experiential aesthetics of cold. This experiential aesthetics of cold guides the spectators' sensory engagement with the film in a manner that precedes and is more primal than the importance of the narrative or thematic layers of his films. Strikingly, although Jensen shoots his films in breathtaking landscapes, he captures the grandiosity of those landscapes in detail through close-ups; his camera moves softly as it scans textures of stone, snow, and wood, the heat of bodies sometimes laying naked in the wilderness, and the cold of the ice, all of which are haptic elements that are typically overlooked when a landscape is filmed using wide-angle camera shots and full views. In a sense, he takes an intimate approach in an environment that invites more embodied immersion than contemplation. An environment in which the material world of the landscape seems to appeal to the visual enjoyment becomes a detailed map of textures and temperature, and it becomes alive in its ecology—that is, in its perceptual dimension created by the interaction between human bodies and the mineral and organic world of matter in the film. Jensen's stylistic identity is born from a lyrical impulse to create meaning through temperature; and for that purpose he uses nature not only as set and background to the film but also as an interactive agent and participant. Jensen achieves that authorial identity primarily by combining different layers of cinematography (camerawork, color and sound design), the local ecology and experiential immersion of film spectators. This is not only why his films can be described as the aesthetics of cold but also why his aesthetics are not merely the result of formal elements of film style (they are not just a grammar of the shot) but

rather enact a method to translate the act of filming into experiential film aesthetics. In this sense, his camera is a strong participant and active agent in the film.

Jensen's determination and commitment to filming in the "cold" of northern Norway, a region subject to harsh weather conditions, has allowed him to showcase local culture and history. Cold and climate in Jensen's films are not merely conditions of the geography; they are ecological elements that take on a cinematic life that Jensen exploits for character development, for his unique narrative style (fragmented, with logical leaps in time and space and minimal dialogue), and for the type of perceptual engagement that he offers spectators. In that sense, thermoception is also a method of meaning-making, related to culture and history—most prominently his thematic focus on the Nazi presence in Finnmark during World War II.

Jensen is certainly not the only director to incorporate temperature into his films. Temperature is such a pervasive element of any environment that it can be found in films from early periods of film history until today. The question, however, is how temperature has been used throughout film history. In other words, temperature forms part of the sensory context of any film's world, but what relevance and use has been attributed to temperature in meaning-making, narrative construction or even spectator experience? Does the sensory context (including temperature) of a film set become neutralized in the process of the film's mediation? Or does temperature occupy a central role in the experience of a film and demand a study of its actual thematic, narrative and experiential impact? It is the relevance and centrality of temperature in Jensen's films that defines his originality because he does not simply employ temperature as a diegetic element of film (as, for example, Charles Chaplin does in *Gold Rush* [1925] by using fake snow). Rather, Jensen uses temperature stylistically, perceptually and to develop stories, characters, themes and a lyrical mood. He also takes advantage of temperature by allowing it to shape the sensory modes of film engagement. In other words, his experiential use of temperature includes the spectator as a fundamental variable in the cinematic experience. His perceptual use of temperature implies a conception of film not just as a medium of cinematic representation in which there are contents (themes and story) conveyed through a stylistic configuration but rather as a mediated experience in which spectators are perceptual participants and thus immersed subjects that are, in a sense, part of the film too or are the film themselves. This centrality of temperature and perceptual experience justifies a case study of Jensen as capable of defining the aesthetics of cold. Jensen's films capture the regional aspects of northern Norway and transform them into a film language that becomes accessible to any spectator, regardless of whether they are familiar with the environment. Among all of these aspects, temperature seems to be one of the most unifying elements of his films. With that in

mind, it is important to trace some context for the use of temperature as a sensory element in film.

Thermoception in Arctic Cinema

Early Arctic Cinema, from the 1910s and 1920s, offers several examples of the central role of temperature in the cinematic representation of the Arctic.² The Arctic expedition film³ is particularly illustrative of the central role of temperature in film. Examples of Arctic expedition films include Med Roald Amundsen's *nordpolekspedition til første vinterkvarter*,⁴ Roald Amundsen–Lincoln's *Ellsworth's flyveekspedisjon 1925*,⁵ *Luftskipet Norges flukt over Polhavet*,⁶ and *Med Maud over Polhavet*.⁷ These films not only document the Arctic during a specific historical period but also tell stories in which the climate is the main protagonist, offering spectators mediated access to extreme weather conditions.

Robert Flaherty's *Nanook of the North* (1922)⁸ is one central example of the use of temperature in early Arctic cinema. Cold is a constant presence throughout *Nanook of the North*, becoming visible through its impact on the characters' movements, their actions and lives and through the visible manner in which cold leaves its print in the material world of the film by shaping the objects and bodies of the film through marks and effects, the state of matter (especially water in its different states) and the ecology of the film's world. In some scenes, we watch Nanook, the father, blowing on his child's hands, which are perceived as cold, with a sense of warmth coming from his breath. The warmth of his breath may be invisible and not physically felt by spectators, but it is perceptible through other means, such as the child's body reaction to Nanook's blowing through the thermoceptive context presented by the film, as revealed by the abundant snow of the set. The scenes inside the igloo place a particular emphasis on temperature from a character-mediate level, as we witness Eskimo family members with parts of their bodies (backs and feet) naked as they prepare to go to bed. Simultaneously, the intertitles read that "the temperature inside the igloo must be kept below freezing to prevent the dome and walls from melting down", and we are therefore offered confirmation (whether fictional or factual) that the environment inside the igloo is cold. On a more narrative level is the example of the final scene, in which the family's survival is threatened by an intense snow blizzard, causing them to delay their arrival at their igloo.

A film such as *Ellsworths Yveekspedisjon*⁹ demonstrates that early Arctic films already had the capacity to evoke the sensory appeal of cold. Amundsen's film is impregnated with ice and snow. The bodies of the characters come into direct exposure with the

Arctic cold as the characters handle snow and ice, sometimes even holding and carrying it with their bare hands. This direct embodied exposure of characters to cold and to cold materials creates a phenomenal and empathic appeal, not only through the dimensions of perception but also through the dimensions of imagination and sensory memory. Temperature, however, also shapes the dramatic and narrative arc of Amundsen's film in its climatic nature, making the crew struggle to survive fog, wind, cold, and icy obstacles in their trip to the North Pole, which imperil their lives and prevent them from reaching their destination. In Amundsen's films and in other Arctic expedition films from the 1910s and 1920s, cold functions on both phenomenal and narrative levels.

In their seminal account of Arctic cinema,¹⁰ Scott MacKenzie and Anna Stenport review Arctic films from the 1950s, focusing on Cold War themes, and propose the concept of Arctic Cinema. The films reviewed include *Where the Mountains Float*,¹¹ *Qivitoq: The Mountain Wanderer*,¹² *Men Against the Arctic*¹³ and *White Wilderness*.¹⁴ Stan Brakhage's experimental artwork, *Creation* (1979), is also considered as part of Arctic Cinema, even though it diverges from the more conventional narrative forms of the feature films mentioned above, for it "offers a vision of the Arctic at odds with almost all cinematic of representations of it. Fragmentary and frenetic, almost devoid of life, Brakhage's Arctic follows on from the Romantic, visionary approach to sight that dominated many of his early films."¹⁵ Clearly, MacKenzie and Stenport's conceptualization of Arctic Cinema includes more than just indigenous cinema and accommodates Jensen's experimentalism. The roots of Arctic Cinema go back to the 1910s and 1920s, and temperature continued to be used with prominence until recent periods of film history, representing not only a narrative element but also having an impact on films' stylistic choices and on meaning-making strategies. Elsewhere, I present a more complete review of Arctic Cinema, but what is important to keep in mind in terms of contextualizing Jensen's aesthetics of cold is the fact that much of the use of temperature in film history is located on the levels of the narrative use of temperature and cinematic themes.¹⁶ What Jensen adds to that is a strong development of temperature as a sensory element outside its narrative use. Instead, he uses temperature as a sensory gateway to create a lyrical mood in his films.

Stella Polaris

Stella Polaris opens on a dreary day. Thermoceptive inferences can be drawn from the first shots in the opening scenes, which show the steam of the character's breath in the cold (the Woman). The Woman wanders in the open, cold, grey streets, lost, wearing only a thin cloth dress. Her disorientation and apparent distress are enhanced by the

thermal discomfort of the environment. There is a matching sense of cold offered simultaneously at the level of the emotion distress, the disorientation and the thermoceptive discomfort of that character in a specific sensory context. The effect of associating temperature with spatial and temporal orientation is not just caused by the direct exposure of the Woman to the cold environment of that city but rather is also in part the result of Jensen's removal of the temporal markers that viewers typically use to construct a narrative. *Stella Polaris* is a complex network of temporal and spatial discontinuous segments that span seasons of the year and periods of the characters' lives, emphasizing the transitions between scenes in a manner that can only reflect an imagined continuity projected by the characters, not an actual spatial and temporal continuity. In an early scene of the film, the Woman is shown on a hospital bed, and the scene alternates between close views of her face and insert shots in which the camera scans the textures of the countryside on a sunny day. In response to the positive feelings that these memories bring her, the Woman's face seems to light up with a subtle smile, or perhaps a Kuleshov effect is created by the juxtaposition of the images. As the scene creates closure, the feeling of peace and tranquility fades out, and the Woman is shown being carried by two nurses and deposited inside what appears to be a fridge or a freezer. This space is recognizable as a room, but overexposure is used to create a lighting effect that conveys the cold inside the freezer. The gestures of the nurses mimic the placing of a dead body inside a freezer, accompanied by the background sound of a boat sailing on the sea. All of these stylistic effects enhance the sensation of thermoceptive and emotional discomfort that the viewer experiences through empathic and character-mediated engagement.

The absence of spatial and temporal continuity, which is replaced by emotional and sensory continuity, creates a diffuse sensation of time, allowing the film to travel through different periods of Norway's recent history and through the Woman's memories and her romantic relationship with the Man. Jensen also removes temporal markers by offering minimal dialogue that provides little information, forcing spectators to engage in a more free and creative process of sense-making and creating opportunities for use of non-verbal cues, such as the permanent camera movement that scans the textures of the film's material world and the thermoceptive cues of matter and of the material world of the film. The near absence of words in *Stella Polaris* enhances the thermoceptive qualities of the film, especially by allowing spectators to focus on the acting and the bodily and facial expressions of the characters while making the camera work very noticeable.

These scenes highlight the connection between emotions and thermoceptive experiences. That connection is not only cinematic and diegetic but also can be projected into the perceptual realm. Studies have demonstrated a relationship between

emotions and body temperature and thermal sensations.¹⁷ This is unsurprising: we are accustomed to experiencing our body temperatures change when we blush from embarrassment or our hands breaking out in a cold sweat when we feel nervous. The connection between emotions and temperature is explained by physiological processes, but before discussing these processes, I will offer a third example in which the thermoceptive film experience is mediated neither by emotions nor by a character. In a scene that revisits the Woman's scorched-earth town, a camera moves steadily along a path that winds between the hills. It is extremely windy, and the path is covered with snow, which is being blown away along the sides of the pathway. The camera moves in the opposite direction as the wind, tilting and bouncing as it struggles to move forward. This struggle is enhanced by the whistle of the wind in the background and a musical score in which the sound of violins merges with the sound of wind. This scene is particularly interesting because it does not create thermoception through an empathic engagement with a character, as the previous examples did. In this scene, the camera embodies a direct perspective that is closer to the spectator's visual point-of-view. It simulates the experience of actually walking along the path by eliciting the affect experience of the sensory elements in the diegetic world of the film. After being exposed to the experience of walking through a cold landscape, the viewer is not rewarded with thermoceptive comfort when the camera reaches the village and reveals only desolation and houses with broken windows that can no longer serve their purpose of providing shelter and protection.

Most media consumers will imagine the Arctic as a place of cold, but for local communities, heat is as primal as cold. Heat is an important element of their feelings of comfort and is associated with the privacy of the home. Heat-related experiences exist throughout Jensen's films and are depicted at the same level of stylistic sophistication as his representations of cold. In a scene from *Stella Polaris*, a house burns, victim to the scorched-earth policy of the Nazi army in Finnmark. Instead of showing it from a distance, Jensen films the incineration as if from inside the burning house, creating the sensation of being immersed in the fire. This generates a sensory effect of immersion, thus allowing viewers to potentially experience the strong physical affect of this scene as if they were also inside the burning house.

As the scene progresses, this visceral affect of presence and immersion gives way to an experience of heat mediated by the reflection of the fire in the Boy's face. The reflection allows the viewer to create a thermal map of his face through the reflection of the light. Characters' bodies can become legitimate sources of thermoceptive information either through the phenomenology of their bodily expressions or through the effects and marks of temperature on their bodies. The marks of temperature on different parts of the characters' bodies may communicate different phenomenal

qualities of perception. Bodies can be mapped in zones of thermal sensitivity, allowing spectators to form character-mediated perceptions and make thermoceptive inferences. Ludwig Wittgenstein formulated this idea in more elegant words than my own when he referred to “the delightful way the various parts of a human body differ in temperature.”¹⁸

Sound and Color Design

The effect of the physical presence of the camera within the burning house and the phenomenal affect generated by the thermoceptive mapping of the Boy’s face are accentuated by the sound design. In this scene, the sound of burning wood is pervasive and encompasses the spectator, creating a sensation of spatial surrounding or enveloping the viewer. Sound and color design transform spectatorship into an experience of immersion and presence made more vivid and visceral than mere spatial immersion with no sensory salience through Jensen’s use of strong thermoceptive cues. Sound and color stylistically enhance thermoceptive experiences throughout *Stella Polaris*. The sound design is subtle, its many layers continually reinforcing a perceptual experience of temperature. One layer of sound consists of water lapping against a dock, producing a sensation of wetness and of immersion in water. Wetness is not a direct thermoceptive cue, but it is related to thermoception because it can enhance sensations of cold and thermal discomfort.

Another sound layer is provided by the score, which was composed by notable Norwegian composer Arne Nordheim. The score is a contemporary piece composed for a violin quartet, a string orchestra that blends with the sound of the wind and other natural sounds such as sea birds and storms, infusing the film with sensations of pain, fear, discomfort, and awe at the intimidating beauty of Finnmark. A final sound layer that pervades the film is created by different tracks of the sound of the wind. This layer of sound creates the sensation of being surrounded by, enveloped by, and immersed in the film rather than being a voyeuristic spectator. These sound layers may not be exclusively related to thermoception and certainly have other implications. However, when combined with other filmic elements, they contribute to a perceptual engagement with the film based on thermoception.

The complex narrative and thematic segments of *Stella Polaris* are organized around a structure of alternating segments. Each of these segments represents a temporal and spatial leap and showcases the characters’ unique emotional reactions to the significance of those moments in their life stories. Jensen gives each of the segments its own color and tonality, whether sepia, black and white, blue, red, gray or green.

This creates a color map of the narrative and of the themes and emotions that the segments embody. It also gives cohesiveness to segments that are broken into smaller segments and scattered throughout the film. In several of these segments, color also has a thermoceptive function, with colors associated with cold, such as grey and blue, matching cold environments and warmer colors and red being associated with warmer environments. The color map in *Stella Polaris* echoes Johann Wolfgang von Goethe's statement, in his *Theory of Colors*, that "Experience teaches us that particular colors excite particular states of feeling."¹⁹

Jensen's film style relies on spectators' perceptual experiences of temperature; otherwise, they would be merely formal manipulations of the camera and of the sound and color design. His authorial language constructs an experiential aesthetics based on the dialogism between style and perception. Through experiential aesthetics, he creates visceral and embodied sensations of cold and heat based on the viewer's capacity to perceive temperature and uses these sensations to develop his characters, organize the narrative and emotionally engage the spectators. Jensen's aesthetics reveal the sensory substance and material essence of northern Norway, made experientially accessible to a broader range of perceptual experiences rather than merely offering a pictorial and grandiose representation of that landscape to delight the eyes.

Perceptual Affect, Character Mediation and Inferential Knowledge/Perceptual Inferences

Through my analysis of *Stella Polaris*, I have identified three levels of the stylistic use of temperature, which I call thermoceptive perceptual affect (experiential level), character mediation (empathic level) and perceptual inferences (inferential knowledge). In the case of Jensen's authorial language, these levels of experiential film aesthetics create room for spectators to engage in specific modes of thermoceptive experience. The experiential level of perceptual affect is created by cinematic elements such as the camera work and the sound and color design. The empathic level mediated by characters results from the phenomenal qualities of the traces of temperature on the characters' bodies and its impact on their emotional states. Finally, thermoceptive inferences can be made using the knowledge obtained about temperature from the physical matter state of objects and materials.

The steady camera scene that I mentioned above is an example of the inducement of direct perceptual affect because there are no characters mediating the scene and much of the thermoceptive effect is created by the actual camera perspective and its

embodied response to wind, snow and cold. The other examples that I offered so far represent cases in which thermoception is induced through empathic engagement with the characters—the Woman, the Man and the Boy mediate access to thermoception by using their bodies as channels or mediating bridges between the temperature from the film's world and the spectators' access to thermoceptive perception of film. The perceptual inference level is achieved through knowledge that spectators can gain from physical states and properties of objects and matter. For example, it is implicit that the temperature in the opening scene, in which the Woman wanders through the streets, is extremely low because the thermal conditions of the set can be understood by showing rain, indicating that although it is cold, the temperature is not below freezing.

Redefining Thermoception

It is commonly assumed that thermoception is defined by the capacity to perceive the temperature from the environment in contact with our skin. However, this represents only one mode of thermoception. If thermoception referred exclusively to the capacity to perceive thermal energy through its contact with our skin, then we would be as objective as an accurate thermometer and would all perceive the same temperature when in the same sensory context, such as a room. However, we may perceive different temperatures when exposed to similar thermal energies because our thermoception is a sense that has a very important, yet often neglected, subjective nature and is modulated by emotions, by internal elements of our biology and physiology, and it is far from being a mechanistic processing of thermal energy. It is at this border of subjectivity and multisensoriality that I see the opportunity to discuss an actual perceptual possibility to experience the temperature of a film's world offered by each or all of the three level of experiential film aesthetics. The notion of an actual perceptual basis of our experience of temperature in film is important for my argument because it implies that this is not exclusively an imagined, projected or remembered layer of our perception of film, and of our phenomenal experiences in general, but rather has a visceral component that shapes our embodied experience of a film more than just at the intellectual levels of imagination, memory or thought. In support of my argument of an actual perceptual basis for thermoception in film are some physiological and neural connections that govern the senses. Thermoception should be redefined from being merely the result of an objective measurement of external thermal energy to being a sensory modality that is integrated into a complex system called homeostasis, which is influenced by our emotions and the other regulatory functions of our bodies.

Homeostasis is a type of biologic clock that regulates our bodies by monitoring and acting on a number of functions that reassure the internal stability of our bodies through regulation of sleep, hunger, temperature and other visceral aspects of our physiology and affective responses to the environment. And this is a biological mechanism resonating with Anne Rutherford's examination of the embodied aspects of film experience, *What Makes a Film Tick*.²⁰ The homeostatic system is strongly connected to emotional regulation, which is unsurprising once we learn that it is governed by the hypothalamus, an essential neural component of our emotional *engine*, the limbic system. Some of these physiological facts are corroborated by anecdotal experiences, such as that we blush when embarrassed or sweat during moments of anxiety. These bodily responses are primarily governed by the hypothalamus, which monitors our emotional responses to the external environment and prepares the body to respond to environmental circumstances. One of the primary manners in which the body prepares for action is by changing its temperature and thermoceptive sensations.

This indicates that there is a level of our biology and physiology working at all times to regulate body temperature and produce different thermoceptive sensations that can help us assess the threats in the environment. The embodied and perceptual experience of a film in the realm of sensory modalities outside the classic five senses is not only remembered, imagined, projected or thought but rather actually makes our bodies "tick" in a physical manner. Thermoception is certainly not an absolute measurement of the external thermal energy in contact with our skin but rather a relative measurement that may be affected by sleep quality or by the amount of popcorn we eat in the movie theater. It has three main components, namely, the actual thermal energy of the environment, the actual temperature of the body regulated by homeostasis and the subjective perception of temperature, which is also regulated by homeostasis. There are innumerable physiological processes that can affect our perception of temperature, and emotions are among the most influential, playing a central role in these regulatory processes. Consequently, films can solicit emotions to induce a thermoceptive experience in the absence of direct thermal stimuli in the film's diegetic world. There is further evidence that supports the idea that a thermoceptive experience can be produced through an audiovisual medium such as film in multisensory studies.

Multisensory studies investigate the integration and processing of various sense modalities in a complex understanding of human perception through brain networking rather than through the more conventional concept of modularity (Fodor). Multisensory studies show levels of perceptual experience in which the brain combines various sensory modalities and cognitive functions to form percepts.²¹ Multisensory studies

change the modularity assumptions of human perception by proposing that instead of a sense-to-sense correspondence between stimuli and brain processing, human perception works in a much more complex manner in which the senses interact with one another. The level of sensory interaction in human perception indicated by multisensory studies suggests that haptic contact with the actual sensory stimuli of the film's world is not a necessary condition to create a thermoceptive experience through an audiovisual medium such as film and again confirms my argument, an apparent paradox, that although the medium is audiovisual, our perceptual experience of that medium is multisensory.

This re-definition of thermoception has made me conceptualize two distinct notions of thermoception: a thermal experience, which is the result of direct exposure to thermal stimuli, and a thermoceptive experience, which has temperature-related qualities but is not directly related to physical contact with thermal energy. Thus, according to the framework of multisensory imagery approaches, thermoception in film is the perceptual capacity to form thermoceptive experiences through sight and hearing and the combination of these senses with emotions, memory, imagination, and even verbal language.²² The combination of the senses on a neural level represents a true paradigm shift in terms of our understanding of the brain with strong implications for our understating of film phenomenology, film perception and the embodied nature of the mechanisms that regulate our bodies. This merging of the senses concept was first proposed in 1993 by Alex Meredith and Barry Stein,²³ but its opposing sense-to-sense paradigm of human perception is still ingrained in the manner in which many film scholars understand film experience as a visual, or audiovisual at most, perceptual experience—an assumption that comes with tremendous limitations because it implies elimination of a broad range of sensory realms and certainly experientially limits the conception of film to either its audiovisual components or to an imagined type of experience. The merging of the senses refers to sensory processing and integration within a synergetic networking system instead of in isolation, as suggested by the paradigm that predominated throughout the 1900s, expressed as follows:

“The traditional sensory processing schemes postulate the presence of sharply defined, modality-specific brain areas, but the modality-exclusivity of sensory brain regions has been challenged over the last decade. Numerous studies have shown that several regions in the visual cortex can be activated by additional modalities, such as touch and hearing. Similarly, different auditory areas have been shown to respond to somatosensory and visual stimulation.”²⁴

Although this idea of multisensory experience may seem counterintuitive to some and abstract and complex, the findings of these multisensory studies postulate concepts that resonate with some of the ideas of film phenomenologists, such as Laura Marks and Vivian Sobchack.²⁵ Furthermore, it may also find correspondence in some common experiences that we all potentially have. For example, the tactile qualities of a texture can be perceived without being touched; they can be discerned by sight and even by hearing the sound of the object making contact with another object or surface. Similarly, depending on our vestibulo-sensitivity, we can develop a sensation of vertigo simply by looking at an image of the view from a tall building. Heat and cold can be perceived by looking at and hearing a bonfire or an iceberg, and listening to the tactile qualities of a piece of chalk in contact with a chalkboard can induce shudders. These cross-modal interactions result from actual external stimuli involved, that is, the audiovisual stimuli of a film. However, they are percepts formed by indirect sensory means. Nevertheless, they provide information about certain sensory qualities of objects and matter. Although we cannot see and hear thermal energy, we can indirectly experience it through sight and hearing.

The cinematic experience of temperature is shaped by the fact that the only means via which spectators gain access to a thermoceptive experience is through sight and hearing, and this fact of sensory indirectness makes thermoception in film more subjective. The embodied and physical responses certainly vary across spectators. Some individuals may not be as sensitive to the sensory cues that elicit thermoceptive responses in film. This principle can be observed in real-world events and in relation to different senses: some individuals experience certain sensations in a more physically salient manner than others. For example, vertigo is experienced strongly by some but not by others. Although I have identified the stylistic elements that produce a cinematic experience of temperature and have provided evidence of the neural capacity to combine the senses, I do not posit that all spectators feel and physically respond to representations of cold and heat in film by shivering or attempting to keep warm. Nevertheless, I do believe that some spectators may be more sensitive to thermoceptive cues in a film and may, according to their emotional states, develop an unconscious physical response that manifests itself through body temperature or thermal sensations. Richard McFarland has demonstrated this phenomenon of subjective experience of temperature in people listening to music. The extent to which spectators experience physical responses may also vary depending on the thermoceptive level. The inferential level, for example, may not elicit as powerful a response as the character mediated and perceptual affect levels, in which there are direct simulations of the effects of temperature on the characters' bodies and the set.

Although all films have the capacity to offer thermoceptive experiences to spectators, film directors do not always use temperature to create such experiences. They may represent temperature at a narrative and thematic level without giving it a salient experiential role. As I have mentioned, an example is found in Chaplin's *Gold Rush* (1925).²⁶ Chaplin's relaxed acting performance while out in the "cold" communicates that what is at stake is the audience's dramatic and emotional engagement with the story, not the experiential level of cold. In fact, the complete opposite may be at stake, namely, the hypothesis that Chaplin is deliberately sending a message that film transcends the physical and sensory constraints of the actual world. Temperature is a cinematic element of *Gold Rush*, but it operates at the level of the story and does not play an experiential role. This example contrasts sharply with the manners in which Jensen uses temperature. In *Stella Polaris*, temperature becomes the substance of the film. With it, Jensen develops his narratives and his characters, but above all, he secures the spectator's experiential engagement with the film and consequently shapes the spectator's emotional disposition towards the ecology of the Arctic regions of northern Norway, creating meaning through the embodied manner in which film spectators experience temperature and the film's material world.

Although Jensen's films are often lyrical, seeming to float and flow smoothly, an underlying disquiet is felt as he prompts the spectator to leave her experiential comfort zone. Characters embody extreme thermoceptive experiences to which spectators, if animated by empathy for those characters, can be strongly drawn, resulting in a shift from story comprehension to sensory experience. Moreover, Jensen's use of the camera is complex and sophisticated: it is simultaneously minimal and fluid, playing a role that goes beyond the mere recording of actions and events within the logics of a shot grammar. The camera is an active agent not only in his film aesthetics but also in proactively immersing the viewer in the landscapes and material world of Finnmark, thereby creating a perceptual rather than exclusively visual experience of landscape and thus escaping more conventional pictorial representations of landscape. Jensen presents the grandiosity of a landscape on a human and sub-human scale, zooming in on sensory details that convey texture, temperature, pain and navigation. In one of the earliest and most fascinating studies of film perception, Hugo Münsterberg summarizes many of these ideas:

The camera men of the moving pictures have photographed the happenings of the world and all its wonders, have gone to the bottom of the sea and up to the clouds; they have surprised the beasts in the jungles and in the Arctic ice; they have dwelt with the lowest races and have captured the greatest men of our time: and they are always haunted by the fear that the supply of new sensations may be exhausted. Curiously enough, they have so far ignored the

fact that an inexhaustible wealth of new impressions is at their disposal, which has hardly been touched as yet. There is a material and a formal side to the pictures which we see in their rapid succession. The material side is controlled by the content of what is shown to us. But the formal side depends upon the outer conditions under which this content is exhibited.²⁸

Münsterberg notes that although our experience of a film is real to the senses, is embodied and is experienced through different senses, it can aesthetically transform the source content to create ever-new cinematic experiences. Film covers a much broader sensory realm than we are used to conceiving, and it has the potential to create new sensory content that allows viewers to experience being in different film worlds with specific materialities that are not just visual or audiovisual but rather multisensory. The specific manners in which film can create room for thermoceptive experiences are based on the indirect use of sight and hearing; however, the culminating perceptual result of those experiences is multisensory—it overflows to other sensory realms, not just sight and hearing. The indirect correspondence between the medium's sensory sources and the resulting perceptual experience offers the paradoxical pleasure of experiencing the cold of the Arctic without the drawbacks of physically being there. Through sophisticated stylistic use of the camera and the sound and color design, Jensen manages to simultaneously build an original authorial identity and language and translate a profound knowledge of the local culture and geography into emotional and experiential engagement that pushes spectators outside their sensory comfort zones, thus making the cinematic Arctic, paradoxically, as real yet as strange as the Arctic itself.²⁹

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Notes

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- ¹ *Stella Polaris*, DVD, directed by Knut Erik Jensen (Oslofilm AS, 1993).
- ² Scott MacKenzie and Anna Westerståhl Stenport, "All That's Frozen Melts into Air: Arctic Cinemas at the End of the World," *Public 48* (2013): 71-82; Jan Anders Diesen, *For God's Sake, Save the Film Rolls* (Oslo: Norwegian Film Institute, 2010); Palle Bogelund Petterson, *Cameras into the Wild: A History of Early Wildlife and Expedition Filmmaking, 1895-1928* (Jefferson, NC: McFarland, 2011).
- ³ Jan Anders Diesen, *For God's Sake, Save the Film Rolls* (Oslo: Norwegian Film Institute, 2010).
- ⁴ *Med Roald Amundsen's nordpolekspedition til første vinterkvarter*, DVD, directed by Reidar Lund (1923; Oslo: The Norwegian Film Institute).
- ⁵ *Roald Amundsen - Lincoln Ellsworths flyveekspedisjon*, DVD, directed by Paul Berge and Roald Amundsen (1925; Oslo: The Norwegian Film Institute, 2011).
- ⁶ *Luftskipet Norge's flukt over Polhavet*, DVD, directed by Paul Berge (1926; Oslo: The Norwegian Film Institute).
- ⁷ *Med Maud over Polhavet*, DVD, directed by Odd Dahl (1926; Oslo: The Norwegian Film Institute).
- ⁸ *Nanook of the North*, DVD, directed by Robert Flaherty (1922; New York: Criterion Collection, 1999).
- ⁹ *Lincoln Ellsworths Flyveekspedisjon*, DVD, directed by Roald Amundsen, (1925: Oslo: The Norwegian Film Institute).
- ¹⁰ Scott MacKenzie and Anna Westerståhl Stenport, "All That's Frozen Melts into Air: Arctic Cinemas at the End of the World," *Public 48* (2013)
- ¹¹ *Where the Mountains Float/Hvor Bjergene Sejler*, DVD, directed by Bjarne Henning-Jensen (1955; Arnø Studio)
- ¹² *Qivitoq*, DVD, directed by Erik Balling (1956; Nordisk Film)
- ¹³ *Men Against the Arctic*, DVD, directed by Winston Hibler (1955; Walt Disney Studios Home Entertainment)
- ¹⁴ *White Wilderness*, DVD, directed by James Algar (1958; Walt Disney Studios Home Entertainment)
- ¹⁵ Scott MacKenzie and Anna Westerståhl Stenport, "All That's Frozen Melts into Air: Arctic Cinemas at the End of the World," *Public 48* (2013), 89
- ¹⁶ Luis R. Antunes, "Norwegian Arctic Cinema: ecology, temperature and the aesthetics of cold," in *Mapping Cinematic Norths: International Interpretations in Film and Television*, eds. Julia Dobson and Jonathan Rayner (Bern: Peter Lang, 2016)
- ¹⁷ Richard McFarland, "Relationship of Skin Temperature Changes to the Emotions Accompanying Music," *Biofeedback and Self-Regulation* 10 (1985), 255-67; Sara Rimm-Kaufman and Jerome Kagan, "The Psychological Significance of Changes in Skin Temperature," *Motivation and Emotion* 20 (1996):63-78; Masazumi Kawakami, Hideo Negoro, Masahiro Yanase, Motohiko Mori, "The Study on the Activity of the

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¹⁸ Ludwig Wittgenstein, *Culture and Value*, 2nd ed. (Oxford: Wiley-Blackwell, 1998), 11.

¹⁹ Johann Wolfgang von Goethe, *Theory of Colours* (Cambridge, MA: MIT Press 1970), 305.

²⁰ Rutherford, Anne, *What makes a film tick? cinematic affect, materiality and mimetic innervation*. (Bern: Peter Lang, 2011)

²¹ Gemma A. Calvert and Thomas Thesen, “Multisensory Integration: Methodological Approaches and Emerging Principles in the Human Brain,” *Journal of Physiology* 98 (2004), 191–205; Gemma A. Calvert, Charles Spence, and Barry E. Stein, eds., *The Handbook of Multisensory Processes* (Cambridge, MA: MIT Press, 2004).

²² Simon Lacey and Rebecca Lawson, eds.. *Multisensory Imagery* (London: Springer Verlag, 2013).

²³ Alex Meredith and Barry Stein, *The Merging of the Senses* (Cambridge: MIT Press, 1993).

²⁴ Laurent A. Renier, Irina Anurova, Anne De Volder, Synnöve Carlson, John VanMeter, and Josef P. Rauschecker, “Multisensory Integration of Sounds and Vibrotactile Stimuli in Processing Streams for ‘What’ and ‘Where,’” *Journal of Neuroscience* 29 (2009), 10950–60, 10950.

²⁵ Vivian Sobchack, *The address of the eye: a phenomenology of film experience* (Princeton, N.J.: Princeton University Press, 1992); Laura Marks, *The skin of the film: intercultural cinema, embodiment, and the senses* (Durham: Duke University Press, 2000)

²⁶ *The Gold Rush*, DVD, directed by Charles Chaplin (1925; New York: Criterion Collection, 2012).

²⁸ Hugo Münsterberg, *The Photoplay: A Psychological Study and Other Writings*. First edition, (London: D. Appleton and Company, 1916; London: Routledge, 2001).

²⁹ Further readings: Luis R. Antunes, *The Multisensory Film Experience* (Bristol, Intellect Books, 2016); Amy Coplan, “Catching Characters’ Emotions: Emotional Contagion Responses to Narrative Fiction Film,” *Film Studies* 8 (2006): 26–38; Henry Donaldson, “On the Temperature-Sense,” *Mind* 10 (1885), 399-416; Heidi Hanson and Cathrine Norberg, eds., *Cold Matters: Cultural Perceptions of Snow, Ice and Cold* (Umeå: Umeå University/Royal Skyttean Society, 2009); Paul L. Harris, *The Work of the Imagination* (Oxford: Blackwell, 2000); Gunnar Iversen, “Learning from Genre,” in *Transnational Cinema in a Global North*, ed. Andrew Nestingen and Trevor G. Elkington (Detroit: Wayne State University Press, 2005), 261-77; Eric Kandel, James Schwartz, and Thomas Jessell, eds., *Principles of Neural Science* (New York: McGraw-Hill, 2000); David MacDougall, *The Corporeal Image: Film, Ethnography, and the Senses* (Princeton, NJ: Princeton University Press, 2005); Bela Mittelman and Harold G. Wolff, “Affective States and Skin Temperature: Experimental Study of Subjects with ‘Cold

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