Entanglements in the Forest:
The Orange GoPro Camera and the Children who Wear Them

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ABSTRACT

In this article, we revisit fragments of data from a three-year study, paying close attention to the entanglements and inseparability of child/plastic/snow/GoPro within children's everyday encounters and narratives in an immersive nature-based program in Canada. We query how these entangled ways of being might help inform environmental and sustainability pedagogical practices, and problematize ideals of human agency and nature-as-pure that are embedded within environmental and sustainability early childhood education. Relying on theories of posthumanism and new materialism (Barad, 2003, 2007; Bennett, 2010; Hultman & Lenz Taguchi, 2010) we examine the bodily, social, and affective intra-actions of nature/child/camera to propose thinking differently about the world and children's relations with the more-than-human world.

An orange GoPro camera is vivid against the backdrop of the falling snow. The GoPro is strapped about the chest of a small girl, ice pellets scraping and pelting its lens. The GoPro records the child's heavy breathing and quickened heartbeat, as its lens slowly fogs in response to the resistance afforded to the child by the knee high and, in some places, waist deep snow. The GoPro is jostled about the child's body as she falls repeatedly in the snow, the deep pockets of snow resisting any opportunities for quick movements. The GoPro has tilted toward the ground from the force of falling and rolling in the snowy field and the child pauses to clear the lens of snow and adjust the GoPro. The steady red blinking of the GoPro (a signal that the camera is operating) is once again visible and the field of snow offers itself up for endless possibilities. The snow, GoPro, and child are entangled within "thing–matter–energy–child assemblages" (Tesar & Arndt, 2016, p. 196). Quite vividly through the lens, nature appears as an agentic force alongside this small child who teeters, loses balance, and then crawls through the uneven terrain, carefully avoiding the tall thistles that appear before her. The field she crosses has offered an array of vibrant encounters throughout the different seasons, its intelligences often embraced by the eight children and their two educators of the nature school program participating in the study. The orange GoPro camera, like the snowy field itself, is agentic and more than the passive backdrop to the children's stories (Änggård, 2016; Malone, 2015; Nxumalo & Cedillo, 2017). The snow/child/GoPro are inseparable sentient and non-sentient actors in this ongoing process to navigate, understand, and experience the field.

Perhaps, the GoPro helps to encourage this shift that Malone (2016) notes: when we move away from "child in nature" as the only agential body, we can focus on the materiality of children and non-humans as relational. In this article, posthumanism and new materialism (Barad, 2003, 2007; Bennett, 2010; Hultman & Lenz Taguchi, 2010) offer a lens to examine the bodily, social, and affective intra-actions of nature/child/GoPro, and to think differently about the child's relations with the world. Thus, we are less concerned about the specific attributes or qualities of the matter itself (i.e., the camera and/or snowy field); rather we ascribe to Barad's (2003, 2007) notion of process, whereby "reality is composed not of things-in-themselves or things-behind-phenomena but things-in-phenomena" (Barad, 2007, p. 140). How does thinking this way help us to challenge environmental and sustainability education[1] that has traditionally been rooted in land conservation efforts? What avenues are possible when we find ways to foster learning to live relationally and ethically with others of this common world (both human and more-than-human) (Taylor, 2013)?

Environmental and Sustainability Pedagogies

As part of the third year of a post-qualitative study (St. Pierre, 2011) of young children's immersion in a forest alongside their educators, we asked what does the socio-material entanglement of the orange GoPro camera, natural world, and child produce and reveal? How can we use these entangled stories (data) and understandings to question and contest early childhood education environmental and sustainability pedagogies and practices? In some ways, the orange GoPro camera helped to support a methodological *slowness* (Millei & Rautio, 2017), the camera naturally capturing the mundane, the multiple aspects that would otherwise remain "unrecorded, disregarded and uncared for" (Horton & Kraftl, 2006, p. 71). The entanglements of nature/GoPro/child help to highlight what was meaningful, the often overlooked, invisible, unpredictable improvisational material encounters – materials that participate fully within early childhood learning and play as vibrant actants. Environmental and sustainability education for the very young can be (re)conceptualized when we embrace ideas of children's dynamic meaning-making[2] that are spontaneous, fluid, dynamic, complex, and relational with/alongside materials. As educators and researchers, we need to pay greater attention to the materials and the intra-actions *with* matter and young children. In opposition to the notion of *interaction* (which presumes objective and independent being of all matter), Barad (2007) proposes the idea of *intra-action* whereby all phenomena intermingle and materially redefine one another through this "process of becoming meaningful" (p. 139). These intra-actions help to refocus humanist traditions of both research and conceptualizations of environmental and sustainability learning. Somerville (2016) explains how a re-focus of '*mutual becomings*' offers new ways of thinking that are so important in this "time of human entanglement in the fate of the planet" (p. 1170). In their most recent research exploring what "literacy + sustainability" might mean for young children, Powell and Somerville (2018) noted, "at this stage we have come to understand sustainability learning as children's continued, deep engagement in activities that connect them to their bodies, to the matter of the planet and to its living creatures" (p. 6).

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[1] In the Canadian context the term environment and sustainability education is commonly used. Here, we use this term in recognition of the complexities of a common world, the interrelations among/between the human and more-than-human world.

[2] In this article, we rely on Karen Barad's (2007) notion of meaning-making where "meaning is not a property of individual words or groups of words but an ongoing performance of the world in its differential dance of intelligibility and unintelligibility" (p. 149).

Developmentally appropriate practice, child centered pedagogy, and the ecological context of the child are phrases often associated with the field of early childhood education (ECE). Historically the central tenants of ECE have been largely shaped by this developmental/humanistic discourse. This human centrism is also evident within the environmental and sustainability literature and learning in ECE (Duhn, 2012). Resultant pedagogies that have predominantly focused on an image of the child as a steward of the environment are ill conceived, given that "placing humans strictly outside the natural world of which they are a part of, and may thereby inadvertently perpetuate the very alienation it seeks to overcome" (Anderson, Comay, & Chiarotto, 2017, p. 109). The 'child as savior' nature narrative figures prominently as a romanticized notion. Immersing children in nature to reclaim children's perceived lost connections to nature is offered as a remedy (Louv, 2005). The presumption is that children experience adverse effects from a lack of contact with nature, what Louv (2005) termed a 'nature-deficit disorder'. The literature on the benefits of children's connections and immersion in natural settings should not be discounted (e.g., Davis & Waite, 2005; Elliot, Eycke, Chan, & Müller, 2014; O'Brien & Murray, 2006, 2007; Slade, Lowery, & Bland, 2013) because of the detrimental effects of an absence of outdoor experiences on human lives is a valid concern (McCormick, 2017). But the sole focus on the human experience, over the material and natural world, constrains productive environmental and sustainability educational discourse and understanding.

By focusing on encounters, intra-actions (Bennett, 2010; Hultman & Lenz Taguchi, 2010; Rautio, 2013), and the 'withness' (Micciche, 2014; Wargo, 2018) between children and the world, more expansive ideas of learning and teaching can be embraced, particularly in relation to environmental and sustainability education. In challenging scholarship rooted in the 'social turn', Micciche (2014) points to the narrowed scope of literacies with the excessive focus on social construction, and previously little consideration for intra-actions among "natural systems, biology, animals, and other forms of matter" (p. 488). In her theorizing about the writing process, Micciche describes a process of 'withness' that is "elliptical, immersive in diverse environments, dispersed, ordinary (not rarified), mediated, ongoing, and coexistent with other activities" (p. 493) so that "writing is contaminated, made possible by a mingling of forces and energies in diverse, often distributed environments" (p. 502). Like others who have taken-up this idea of withness in describing the inseparable aspects of the writing process of young children (Wargo, 2018), we also stress the importance of "withness-ing, a relational assemblage made possible by the mingling of forces, energies, technologies, and affects" (p. 503) within environmental and sustainability learning. Here, we describe this *withness-ing* using Barad's notion (2007) of *intra-action*, the material world acting upon children and children acting upon the material world. Climate change, environmental crises, water and food scarcity and the like, are reminders of the agentic forces of nature and the entanglements of the human and non-human world co-existing in a process of "ever-changing becoming" (Powell & Somerville, 2018, p. 2). Clearly, if we are to grapple with issues related to the fate of the planet (Somerville, 2016) and "move beyond humanist stewardship frameworks and their implicit exceptionalist assumptions" (Taylor, 2017, p. 1449) new ways of thinking are needed.

Theorizing Differently

In this paper, we use a post-humanist conceptual framing within new materialism theorizing (Barad, 2003, 2007; Bennett, 2010; Hultman & Lenz Taguchi, 2010) to invite the possibilities of considering the influence of the learning child's socio-material engagements with an Orange GoPro camera within their more-than-human contexts, the spaces and places where children, teachers, and the world coexist (Barad, 2007; Haraway, 2008; Somerville, 2010; Taylor & Giugni, 2012). Although the epistemological foundations of posthumanism and new materialism differ, both theories focus on the importance of "relational

ontologies, a critique of dualisms, and engagements with matter and the non-human" (Bozalek & Zemblyas, 2016, p. 193).

Specifically, Taylor, Blaise, and Giugni (2013) write, "a post-human landscape repositions childhood within a world that is much bigger than us (humans) and about more than our (human) concerns. It allows us to reconsider the ways in which children are both constituted by, and learn within, this more-than-human world" (p. 49). Correspondingly, (new) materialism recognizes matter as agentic, part of the dynamic intra-active process of becoming, something Barad (2007) refers to as agential realism. Disrupting human exceptionalism paves the way for new ways of thinking within environmental and sustainability education. Children's intra-actions within their 'everyday' complex, messy, entangled encounters in the woods provides a context for provoking environmental thought and actions.

In our study, neither the GoPro nor the child (or stick, thistle, snow, plastics, and so on) have agency on their own. Rather, it is the interplay between GoPro (matter) and the child that we argue is significant, what "emerges *in-between* different bodies involved in mutual engagements and relations" (Hultman & Lenz Taguchi, 2010, p. 530). The GoPro tips and pivots downward, the child readjusts her body in relation to the snugly bound camera about her chest, she uses a gloved hand to wrestle the GoPro back to its original position, the red light steadily blinks to cue the other children watching that the GoPro is functioning again. It is this interplay, intersections of matter, 'withness' of entanglement of all the agentic actants (both human and more-than-human) that "frame our existence" (Micciche, 2014, p. 489). The encasement of the GoPro in single-use plastic affords opportunities to record in the rain, snow, and mud while also provoking discussions with the children about plastics, disposal methods, individual's responsibilities, and exploring the impacts of plastics on the wildlife in the woods. Hultman and Lenz Taguchi (2010) emphasize that this intra-activity or relational materialist understanding helps to conceptualize both the child and matter as active (agentic), entangled, interdependent, co-existing, "an assemblage of overlapping and intra-acting forces" (p. 532). Clearly, '*being-of-this-world*' (Lenz Taguchi, 2010) and finding sustainable solutions for some of the world's most precarious environmental issues will require a different theoretical framing, one beyond human exceptionalism.

Challenging the Notion of Human Exceptionalism

A dualism lens pits nature and humans at odds with one another where clearly more symbiotic relationships and intra-actions help fuel a broader understanding of an interrelated world (Tsing, 2015). Posthumanism helps challenge the centralism of humans by re-focusing on the interdependence between people and the more-than-human world. For children, this more-than-human world often includes the mundane, the unsanitized, "the not-always-gorgeous" (Taylor & Pacini-Ketchabaw, 2015, p. 526). As researchers, we were witnesses to the entanglements of child/plastic/snow/GoPro within their everyday playful processes and meaning-making. We ask how these entangled ways of being might help to inform environmental and sustainability pedagogical practices, and ideas related to 1) agency, 2) mutual reciprocity, and 3) ethic of care toward all living and nonliving matter.

The privileging of humans as the center, responsible for both the precarity and salvation of the natural world, seems counterintuitive. Simply put, the worm relies on microscopic organisms of a plant; the bird is entangled with the life of the worm, and the bird acts as a pollinator of plants that humans depend upon. The presence of microplastics in more than a quarter of all fish attests to the thoroughness of how infused humans and non-humans are with one another (UN Environment Report, 2017). Nature/culture binaries can be reconsidered through this lens of ecological interdependence (Plumwood, 2002) and humans/non-humans alike recast as 'performative agents' (Barad, 2003, 2007) within the 'natureculture'

collective (Haraway, 2008). Ontologically, Haraway proposed the idea of the natureculture collective to highlight the impossibility of separating nature and culture, and as a challenge for rethinking boundaries between human and more-than-human, organisms and machines, dead and living. For Haraway, the natureculture collective is a "web of differences capable of interacting with the other" (Bruno, 2013, p. 105). Here in this article, we narrowly focus on the entanglement of the Orange GoPro camera, while also dutifully recognizing that the natureculture collective encompasses more than non-living matter (e.g., rocks, sticks, technology, etc.), and nonhuman living organism (e.g., animals, bacteria, plants, and so on) (Cutter-Mackenzie, Malone, & Barratt Hacking, 2019) are equally important to the notion of *becoming with* and *kinship* that Haraway proposes (2008, 2016).

The notion of kinship (Haraway, 2008, 2016) recognizes the mutuality, assemblages of relationality, interdependence, and entanglements of all worldly things. Haraway (2016) proposed "no species, not even our own arrogant one pretending to be good individuals in so-called modern Western scripts, acts alone; assemblages of organic species and of abiotic actors make history, the evolutionary kind and the other kinds too" (p. 100). Thus, within this process of becoming worldly *with* others (including the more-than-human) we can reimagine the concept of agency as dynamic.

Similarly, Barad's (2007) concept of performativity "acknowledges and takes account of matter's dynamism" (p. 135), its agentive fluidity and iterative capacity. Like humans, matter is part of the "ongoing reconfigurings of the world...the agential intra-activity in its becoming" (p. 141). This concept of intra-activity requires recognition and respect for both the human and more-than-human world. Significantly, within these intra-actions of organisms, matter, and discourses learning occurs (Lenz Taguchi, 2010). When we recognize that humans are not *separate from* but in a process of *becoming-with* (Haraway, 2008, p. 4), then we can conceptualize children's being and learning within "an interdependent relationship with the world that we come to know through intra-activity within the material-discursive embodied realities we live in and with" (Lenz Taguchi, 2010, p. 39).

Clearly, a reorientation of "ways of seeing, feeling and being in the world that recognise human inter/dependence within the world" is needed (Ritchie, 2016, p. 79). Children's intra-actions with 'others' does reveal new insights into their play worlds and lives (Harwood & Collier, 2017). Yet, these every day and often ignored materialities serve an important reminder that children are already "co-present with organisms, species, ecologies, nonhuman actants and 'natural' materialities" (Horton & Kraftl, 2017, p. 5). The posthuman-materialist turn helps to recognize the material-discursive phenomena of both human and more-than-human alike.

The Orange GoPro camera as agentic matter helps to refocus our queries and (re)consider the intra-actions of materials and children, their embodied entanglements within the contexts of an enmeshed real world; a world with an uncertain ecological future (Taylor, 2017). Increasingly, scholars advocate for moving beyond human centrism and finding new synergies between diverse theoretical frameworks to help address the limitations of environmental stewardship (Common Worlds Research Collective, 2018; Taylor, 2017). Like Powell and Somerville's (2018) challenge to literacy scholars, we also propose that open, less representational ways of theorizing helps confront anthropocentricism, address the hierarchal relations that currently exist between humans and more-than-humans, and "facilitates an openness to the world, a way of thinking that frees the human from the boundaries of traditional practice(s)" (p. 3) within environment and sustainable education. Clearly, this calls for new ways of experimenting within research that are also open and experimental.

Experimenting and Inventing as Research Creation

In each of the three years of study, participants have included human (eight children aged three and four years old and parents, educators, researchers) and non-human actors in a natural woodland of a Canadian university campus. At the outset of the study, we envisioned a research orientation that aligned with our humanist training in ethnography. We planned observations, digital photos and GoPro videos, text and material productions; a research orientation of *child as producer* (Rowsell & Harwood, 2015). Immersed in the woods alongside the children, educators, and matter was a destabilizing experience as researchers' roles had to be flexible, playful, probing, open, and curious. As observers and co-players alongside the children and materials of the woods, both subjects of the GoPro videos taken by the children, and fully enmeshed in the encounters in the woods, the researchers engaged in what Powell and Somerville (2018) describe as "deep hanging out" (p. 12); an immersive and engaged methodological observational approach where the researchers observe without preconceived notions.

Caton and Hackett (2019) also suggest that the idea of a detached objective researcher is not applicable given the inseparability of being and knowing (p. 362). Much of our process was experimental, flexible, and playful – recognizing that a preconceived methodology would be limiting. Post-qualitative inquiry "begins with an encounter with the real, not with method" (St. Pierre, 2019, p. 11). Thus, we immersed ourselves in the woods remained open and inquisitive, continuously engaged in sense-making processes; a flexibility which afforded more opportunities to "stumble upon" (Brinkmann, 2014, p. 724) matter, children, educators, and relations with others (both human and more-than-human). Brinkmann (2014) reminds us that as researchers we should "allow ourselves to stay unbalanced for a moment longer than what is comfortable, for this is where we may learn something new" (p. 724).

Elsewhere, we have described our methodological processes as qualitative moving toward post-qualitative research (Harwood & Collier, 2019), fully cognizant that our habits of seeing (Hultman & Taguchi, 2010) are rooted in humanist discourse and practices as early childhood education scholars. Certainly, the challenge in representing the data fragments (although we prefer to think of the fragments as storied and open to interpretation) is the inherent limitation of representation and we invite the reader to consider an approach of "'flattened' logic where discourse and matter are mutually implicated in the unfolding emergence of the world" (MacLure, 2013, p. 660). Thus, although within this paper we highlight two storied fragments of entanglements with the GoPro camera from the third year of the study, we opted to align our work with the concept of *methodological slowness* (Millei & Rautio, 2017), viewing the data fragments as ever-changing stories that remain open and fluid. Here, we offer our interpretation, inviting the reader to (re)consider the possibility of multiple patterns and meanings that exist. The material-children entanglements are (re)visited as data that 'glows' (MacLure, 2013), fostering our own wonder as researchers and making room for something new to emerge.

Entanglements in Context

The context for the study was a natural, somewhat uncultivated wild space, located on a university campus in southern Ontario, Canada (Figure 1). The woodland area was shared with many 'others' such as, trees, shrubs, plastic bottles, ferns, mosses, squirrels, turkeys, deer, beer cans, humans, and so on. We have purposefully named some of these others to highlight the complexities inherent within a natural space while also trying to draw attention to what Horton and Kraftl (2017) refer to as the hidden or reductively-summarized everyday social-materialities of childhood.

Figure 1: Woodland Context

Twice each week, from September to June (typically from 9 in the morning until noon), the GoPro camera, eight children and their two educators ventured into the woods to participate in a nature-based program that was described as a collective-emergent model of learning (Harwood, Facchini, Randall, Ratilainen, & Robitalle, 2017). Typically, one researcher accompanied the group of human participants on one of their scheduled trips into the forest each week. Immersed with the matter of the woods, alongside the children and educators, we were observing, playing, engaging, documenting, and recording as much as possible with notes, photos, and videos, fully cognizant of the inadequacies of each mode to represent the messiness of matter/child (MacLure, 2013). Throughout the project, the GoPro/children encounters also afforded ways to pay attention to children's bodies, an important aspect of materialities given that bodies are related to all matter (Horton & Kraftl, 2006). Pragmatically, the outward view of the GoPro camera also helped to disrupt a humanistic focus of the research process—the GoPro often capturing much more than the researchers (Figure 2), whose trained tendency was to focus on the children. Somerville (2017) advocates for new methodologies, experimentations with "children [that] disrupt the sense of control, rationality, and autonomous self of both children and adult researcher. Both are positioned as embedded within entangled more-than-human worlds where the researcher is not the only agent, and often the least important in the focus of attention" (p. 409).

Figure 2: GoPro Intra-acts with Child's Body

Choosing Data that Glows

As researchers, we choose the data fragments based on MacLure's (2013) elusive concept of 'glow'. Admittedly, we also used humanist traditions and thematically catalogued the GoPro videos, constantly comparing our individual and collective interpretations. As St. Pierre (2011) points out, it is challenging to remove the 'I' from qualitative research. However, we did pay attention to the GoPro camera and the videos' affect on both the children and researchers, noting visceral responses to the sights, sounds, and the movement. The two fragments chosen were also perplexing, defied easily interpreted meanings, and reductive explanations, their *glow* drawing our attention to the ways in which they "resist analysis, refuse to render up its meaning" (MacLure, 2013, p. 661). Similar to Somerville's process in the 'Love your lagoons' project (2016), these two fragments were carefully chosen given they tended to "stand out from the large body of data seeming to command new and different forms of recognition about what it means to be human in the context of human entanglement in the fate of the planet" (p. 1162). We viewed/experienced the videos multiple times, engaged in writing, reflecting, and discussing our individual interpretations, often frustrated by the process and the need to repeat our sense-making processes.

As Brown, Dilley, and Marshall (2008) contest, "visual data should not be treated as a direct representation or reflection of 'reality' in any straightforward sense" (p. 2). Thus, the visual data gathered from the GoPro should not be viewed as a simple record of what occurred, but instead a "constructed representation that may be used to evoke a sense of subjective positions and experiences" (Brown et al., 2008, p. 2). From this perspective, the GoPro helped us to slow the process of rushed interpretations and explore again and again the entanglements of child/plastic/snow/GoPro, attending to both the visual, sounds, movements, and flow of all things that were in motion. In the next section, we offer our

interpretations of how we have come to understand the fragments (at the moment of writing) and the ways in which these insights might help open up pedagogical possibilities within environmental and sustainability education.

GoPro as Friend

The 'GoPro as friend' fragment of data vividly depicts one of the heaviest snowfalls of the winter season experienced during the third year of the project. The GoPro camera was worn as a chest harness on elastic suspender-like straps on the outside of children's snowsuits. Two layers of plastic covering protected the GoPro, the outer layer a vivid orange casing. In the initial video clip recorded this particular day, once outdoors the child (Danika[3]) moved her body in relation with the GoPro, pivoting in different directions to capture all that she saw.

> *Snowy fields, ice crusted cars, mitts engulfed in a sea of white are all captured by the GoPro camera's lens. The camera moved in unison with Danika's commentary about another child arriving, the smaller children entering the fenced yard area, and so on. The snow was deep for these small children as well as inviting, Danika flopped into the fluffy snow then quickly rebounded to her feet stating, "I can't get the camera dirty". The nearby evergreen tree looms onto the GoPro view, and the tree, pinecones, camera, and child intra-act in a tugging and wrestling of the branches (Figure 3). Freeing a handful of pine cones from the tree, Danika crawled underneath the extended branches and into an intimate space that the children liked to inhabit prior to the trek to the woods. Here, she introduced the GoPro to the space and pine cones as well as some of the other children beneath the tree. The pine cones are tossed about into piles, rearranged, and tossed again. Other children pose in front of the GoPro, talking to the orange casing, ensuring the red light is blinking, or hold up their own materials to the camera's lens.*
> *(Researcher's Interpretation of GoPro Recording)*

In this initial 20 second video clip we are invited into the motion of the GoPro, child, snow, evergreen, and pine cones. The sounds of a wrestling snowsuit, heavy breathing, crunching of pine cones, swish of tree branches, and scraping of snow and ice against materials. Silence marks the first seconds of this clip, and meanings are generated from the ongoing performance of human/nonhuman intra-action.

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[3] All children's names are pseudonyms.

Figure 3: Human/nonhuman Entanglements

Barad (2003) reminds us that "practices of knowing cannot be fully claimed as human practices, not simply because we use non-human elements in our practices but because knowing is a matter of part of the world making itself intelligible to another part" (p. 829). The sights, sounds, bodies, GoPro, materialities all entangle in this moment of dynamic intra-action. Each time we return to the video it affords us an opportunity to hear, see, and feel something else. The GoPro is entwined with the children's bodies and the actions that unfolded were incumbent of bodies and cameras entangled with each other, humans and materials' agentic forces each affecting the other. How does the GoPro help us to understand *things in-phenomena* (Barad, 2007)?

For the researcher, the video clip showcases the importance of these intra-actions among all matter and how the entanglements of human and more-than-human encounters are experienced and interpreted. The centrality of humans is reoriented here to consider the interdependence between the children and the more-than-human world (GoPro, snow, ice, pine cones, and so on). Barad (2007) reminds us of the inseparability of human/nonhuman, "practices of knowing and being are not isolable, they are mutually implicated. We don't obtain knowledge by standing outside the world; we know because we are of the world. We are part of the world in its differential becoming" (p. 185). The study of children and material in phenomena, what they do together, is significant in advocating for more expansive ideas of environmental and sustainability education. This vignette offers a way of understanding the importance of encounters, the ways in which ecosystems might change and be affected from the intra-actions of these diverse entanglements. We concur with Powell and Somerville (2018) who speak about "moments where we find children completely immersed in activities that connect them to their bodies, to the world, and to its living creatures, and we see them connected with intensity, vitality, and sustained engagement" (p. 20). These crucial moments are important for researchers (and educators) to pay attention to, given that deep engagement can provoke opportunities for environment and sustainability learning. We advocate for complete immersion and intensity of these encounters between children and the world, entanglements that are often messy and complex.

Unsettling Encounters

The woods invited opportunities for running, obstacles to climb, pathways to navigate and materials to immerse oneself (e.g., open fields, trees, mud rolling, lake water, garbage collecting). With the GoPro harnessed over her bulky winter coat, Etta (a second participating child) was emboldened and raced to lead the group on their walk through the forest. As the GoPro operator, her voice was louder, booming, and authoritative as she made directives on where the group should go, what materials should be engaged with or ignored. The sound of Etta's heartbeat pounding loudly on the GoPro's recording reminds us of the physical affordances of the matter of the woods. The GoPro was central to the activities that unfolded, litter displayed before the camera lens, a bag shuffled in front of the lens, and various small hands (including Etta's) pushing the garbage into the bag. Etta's voice shouted loudly, "animals are allergic to garbage!" In a subsequent 20 second clip, a favorite spot appears before the camera lens and a brief moment of silence ensues.

> *The pristine lake is framed by the orange-reddish glow of an autumn marsh, a blue sky with fluffy white cumulus clouds, all reflected in the stillness of the water (Figure 4). The GoPro and child's body turn to pan the wooded area directly behind where multiple other plastic bottles litter the woods. Etta paused momentarily before forging into the woods to collect a plastic bottle. The leaf covered ground rising up in clear view of the lens, movements are unbalanced, a plastic bottle is grasped, first resisting Etta's efforts to untangle the bottle from its resting place amongst the underbrush. The sound of ice rattling can be heard on the video along with Etta's voice remarking "ice in it, ice in it". There was a crinkle of the plastic refuse bag, and her educator's comment, "oh you missed" as the plastic bottle resists being deposited into the bag and falls to the ground. Etta reaches down to retrieve it and successfully deposits into the bag the second time (Figure 4). A bright yellow plastic drinking cup with vivid purple letters is burrowed underneath a nearby tree, the GoPro and child crouch beneath the prickly branches of the tree that protect the cup and slowly retrieve the litter. A flash of yellow disappears into the refuse bag. (Researcher's Interpretation of GoPro Recording)*

Figure 4: Unsettling Encounters in a Favored Spot

Human and material encounters with/between Etta and others were often reserved and detached; she was a somewhat reticent player in the woods with a preference for material encounters that were 'sanitized' (e.g., drawing materials brought to the woods from the classroom). The GoPro seemed to invigorate Etta, promoting an increased sense of her own agency, and ultimately contributing to her exemplifying a "more-than-human caring practice; where caring involves affecting and becoming affected" (Nxumalo, 2018, p. 155). Like the discarded plastic bottles in the woods, the refuse bag the teacher carries, and the orange covering of the GoPro camera itself were all made of disposable plastics. Thus, the plastics, like nature, acted as co-conspirators in the encounters. We recognize that Etta and all members of the group were not separate from nature, immune from the "environmental crisis we are facing" (Atkinson, 2015, p. 69). The matter in the woods can be described as "characteristically murky, massy, out-of-sight, elusive, and in process" (Horton & Kraftl, 2017, p. 4). Throughout our time in the woods, the co-presence of plastics, snow, lakes, trees, dead tadpoles, a rusted car, and so on were enmeshed with the children's lives, play, and experiences.

These materials took up residence and prominence in children's understandings and dynamic meaning-making processes. The children expressed an increased awareness and ethic of care toward living and nonliving matter, perhaps resultant from the entanglements of matter and bodies. Children became noticeably angered specifically when discovering garbage, blaming adults for the mismanagement of litter. Tangentially, litter was also incorporated into children's play, their art work, stories, construction projects, everyday conversations, and so on. For children, matter resisted simplified classifications; rather experiences and responses were generated from these child/material encounters. For example, the plastic bottle was conceived of as litter and, in a subsequent encounter, a snail's home; the orange plastic GoPro cover was a marker of importance, a protector of the camera while also entitling the child as 'movie maker'. Thus, materialities were resistant to any sort of idealization, simplified categorization, or romanticized notions of child in nature. By paying attention to these and similar unsettling encounters, we advocate that entanglements and reciprocal relations of human/nonhumans better characterize children's experiences of/with/in nature.

Intra-actions with the World

The Orange GoPro camera was agentic, affecting the ways in which children intra-acted with the world and those around them. The GoPro was physically embodied, while also taking up residence within the children's play, narrations, and experiences. The snow, pine cones, plastic bottles, and so on were important material encounters that shaped children's thoughts, actions, and ways of being in this world. Thus, young children's material encounters are complex, relational, and vibrant (Rautio, 2013). Additionally, and antithetical to the idea of 'nature as pure', separate from culture, somewhat abstract and devoid of agency, the socio-materialities in the woods reveal a messy, mundane, unsanitized, conflated co-existence of child/materialialities. This conflation and messiness can be challenging for researchers. The co-presence of a GoPro camera alongside all sorts of matter were enmeshed with the children's lives in the woods and serve as an important referent in understanding and challenging theories of environment and sustainability learning and teaching. Lenz Taguchi (2010) queries, "how can we teach without taking into account how learning is enacted in intra-action with the materials we handle, the environments we inhabit and the organization of time, places and spaces in our early childhood practices" (p. 61)?

This research helps to add to our understanding and conceptualization of how shifts in environmental and sustainability learning are possible when we think about the ways in which children are constituted *with*

and *by* their relations with the material world; entanglements between human and more-than-human world. By focusing on the encounters, the intra-actions (Bennett, 2010; Hultman & Lenz Taguchi, 2010; Rautio, 2013) of children and matter, more expansive ideas of learning and teaching can emerge. As researchers, "once tuned into these possibilities, opportunities to think collectively with children in the presence of human, more-than-human, and inanimate others present themselves" (Somerville, 2017, p. 409). The Orange GoPro camera was an agentic force throughout our process, helping to uncover the messiness of the entanglements between child/nature/GoPro. At times the embodied camera prompted children to demonstrate mutual reciprocity and care toward both human and more-than-human others; alternately the camera acted as a friend in the forest capturing small moments of entanglement. Ultimately, the study helped to highlight the mutuality, co-dependence, and uniform vulnerability of both the human and non-human worlds (Atkinson, 2015).

Reflecting with the Orange GoPro

The Orange GoPro camera sits quietly on a shelf in the researcher's office, bits of dried dirt on its casing– a reminder of the time in the woods. The camera acts as a prompt to (re)consider the other complex stories of entanglement that have been left untold, *what else matters? What other ways of relating to the world are possible?* Matter is agentic, and clearly by examining the bodily, social, and affective intra-actions of nature/child/camera, as researchers and educators we can provide new, complex ideas of how to relate to the 'natural world', and children's' place within it. Taylor (2013) argues, "twenty-first children need relational and collective dispositions, not individualistic ones, to equip them to live well within the kind of world they have inherited" (p. 117). We, too, see this relationality and entanglement between the human and more-than-human as leading to new possibilities for environmental and sustainability learning and teaching.

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