OUTLINES - CRITICAL PRACTICE STUDIES

• Vol. 24, No. 1 • 2023 • (4-44) •
www.outlines.dk

Rearticulating theory and methodology for *perezhivanie* and becoming: Tracing flat CHAT assemblages and embodied intensities

Paul A. Prior[a], Julie A. Hengst[a], Bruce Kovanen[a], Larissa Mazuchelli[b], Nicole Turnipseed[c], and Ryan Ware[d]

[a]University of Illinois, Urbana-Champaign, USA; [b]Federal University of Uberlandia, Minas Gerais, Brazil; [c]University of Denver, Colorado, USA; [d]Landmark College, Vermont, USA

Abstract

Taking up Lemke's (2000) critical questions of how moments add up to lives and social life, we articulate theoretical and methodological frameworks for perezhivanie *and becoming, challenging binaries that splinter entangled flows of* perezhivanie *into frozen categories. Working from a flat CHAT notion of assemblage to develop an ontology of moments, we stress consequentiality, arguing it emerges in intersections of embodied intensities (not only affective, but also indexical, intra-actional, and historic), the dispersed bio-cultural-historical weight of artifacts and practices, and dialogic resonances across moments. Methodologically, we take an ethico-onto-epistemological perspective to systematically study* perezhivanie*. Bio-ecological models of enriched/rich environments (centered around meaningful complexity, agency, and individual optimization) offer both a key framework for understanding becoming and a design framework for transdisciplinary realizations of ethico-onto-epistemological practice. We illustrate these frameworks with examples from four research projects: a university physics lab group doing and writing an experiment, a former pastor managing bipolar disorder and rejecting faith, a sustained social justice education program at a university, and intersections of aging policies, media representations, and stroke survival in Brazil. Finally, we argue that an ontology of moments centered on consequentiality can illuminate* perezhivanie's *relationship to becoming and that the model of rich environments offers metrics to assess and design environments.*

Keywords: affect; dialogic semiotics; rich environments; ethico-onto-epistemology; becoming

Introduction

Lemke (2000) identified two basic questions about how human *becoming* relates to timescales, asking how "moments add up to lives" and how "our shared moments together add up to social life as such" (p. 273). His questions focus attention on both what is happening in particular moments and how trajectories across moments come to form lives. Consider a moment from research Hengst conducted on *Cindy Magic*, a make-believe game developed and played by her husband (Paul) and their two young daughters (Nora, age 8; Anna, age 3) (e.g., Hengst, 2015; 2020; Hengst & Miller, 1999). Gathered in their living room around a laundry basket, Paul, Nora, and Anna are engaged in a familiar chore (folding their laundry and separating it into piles by person or use), while Hengst (mom/researcher) is watching and videotaping their interactions. Paul and Nora are each folding items and Anna is tossing a washcloth in the air. At the same time, the three are playing sisters in *Cindy Magic*: Nora acting as Mary Magic (the oldest), Paul as Elizabeth (the middle), and Anna as Jane (the youngest).

> At one point, Anna pauses her play and stands raptly still to watch an exchange between Paul and Nora: Elizabeth (Paul) is holding a shirt up to his chest as if checking the size and asks, "Mary, is this your shirt or mine?" Mary (Nora) replies, "Uh:::::: I think it's mine." Paul begins folding the shirt and quietly replies, "'kay". Although the shirt had clearly been too small for him (Paul/dad), he voices Elizabeth to claim the opposite, "Yeah it's too um … too big for me." Hesitating, Nora seems at first to shift out of the Magic world to contradict her dad's claim, "… it's:" but pauses when Paul looks up and they exchange a quick glance. Mary (Nora) then grins and still looking at Paul shifts back to her role as the oldest Magic-sister and in a matter-of-fact tone agrees, "Yep too big." Looking back at the shirt he's folding, Paul nods slightly and voices Elizabeth's agreement, "too big for me."

In this brief exchange, Paul was clearly playing with material and imagined indexical fields—how the shirt's size compared with his and Nora's physiques in contrast with their imagined physiques as Elizabeth and Mary.

Observing this exchange, Hengst was struck at the time by the palpable sense of Nora's enjoyment as she caught on to Paul's indexical play—after all, she as Mary was bigger than Elizabeth! In later interviews, both Paul and Nora commented on this moment in the video—noting that playing with character roles like this was "fun." The four people present that day have all recalled the marked enjoyment of that moment and reported "seeing" it expressed then in Nora's facial expressions and actions and again later when watching video of the interaction. All have also reported reexperiencing some of that affective intensity when watching the video. However, other people, who have experienced the interaction only by watching the video, have reported not "seeing" Nora's striking enjoyment. Michiko Hikida (personal communication, Nov. 16, 2018) has called this type of embodied sense (both its power for participants in the moment and its elusiveness to those who weren't there) "a sparkle moment." This moment of *Cindy Magic*

play has become a theoretical and analytic touchstone for us for many reasons, including the play of indexical fields around the shirt, the laminated orchestration of multiple activities[1], the ways embodied sense informs recognition of sparkle moments, the role of embodied memories in analysis of videotaped activity, the challenges of systematically identifying such intensities and analyzing how they are experienced, and the dialogic resonances that have emerged across lifespan trajectories in the years (now decades) since then.

Addressing his own questions, Lemke (2000) highlighted one key mechanism shaping both the sense of what is happening here-and-now and the integration of moments across time: "the circulation of semiotic artifacts (i.e., books, buildings, bodies) that enables coordination between processes on radically different timescales" (p. 275). However, when we ask how moments add up to lives, it seems clear that the answer is not simple addition, that in human becoming all moments are not equally consequential. Thus, we need a robust ontology of moments that illuminates the textures and consequences of experience with and across moments.

Vygotsky's (1987, 1994) entwined notions of *sense* and *perezhivanie* (the Russian word that posits experience as distributed across people and their historical-material environments rather than only within people) are critical to that ontology. Recent uptakes of *perezhivanie* (e.g., Ferholt & Nilsson, 2016; Fleer et al., 2017; González Rey, 2019; Roth & Jornet, 2016;) have centered on experience, subjectivity, sense, and affect. Insisting on the need to attend to the development of the whole person, González Rey (1999, 2009, 2011, 2019) argued that *perezhivanie* and sense challenge dominant frameworks of cultural-historical activity theory (CHAT), which have primarily focused on development of specific psychological systems (e.g., memory, classification, problem-solving) or social practices (e.g., mathematical reasoning, literacies) or since the 1980s have shifted away from persons to analyze activity systems and their objects. González Rey (2014) also argued that Leont'ev's (1978) account of personality and subjectivity as processes of psychic reflection was too thinly articulated and too externally centered to generate a distinct line of work. Stetsenko (2017) observes that Leont'ev's promising, but undeveloped definition of activity as "a molar, non-additive unit of life of the corporeal, material subject" (Leont'ev, 1978, p. 50) generated a puzzlingly limited uptake in the literature.[2] In contrast, González Rey (2019) construed subjectivity as "ontologically defined by the integration of emotions and symbolical processes, forming new qualitative

[1] Drawing on Goffman's (1974, 1981) notions of lamination (the way participants in situated activities routinely orient to multiple social activities, co-producing and negotiating complex blends of frames/footings), we use both the noun (lamination) and the adjective (laminated) modifying other key terms (e.g., assemblage) to stress the multiplicity of histories that converge at, emerge during, and spread from moments of activity.

[2] Prior and Shipka (2003) offered one possible explanation: "A potential terminological and conceptual confusion arises in activity theory. Activity names the whole, but it also technically names one of the parts of the whole. Activity[1], the whole, is concrete historical practice, the total, the union and disunion of all the things going on; it is what is happening. Activity[2] is the analytical plane that pulls out the collective and motivated as opposed to action and operational levels….Thus, when Leont'ev (1978) says that all activity is multimotivational, it signifies that activity[1] always involves multiple, co-present activity[2]'s" (p. 206-207). Leont'ev's (1978) brief definition of activity as a whole unit of life ends up submerged beneath frequent, detailed discussion centered on the analytic frame of activity-action-operation.

units: subjective senses… symbolic emotional flashes that unfold in a chaotic movement, from which subjective configurations emerge as a self-regulative and self-generative organization of subjective senses" (p. 28). We would argue his allusion to flashes and chaotic movement aligns tacitly with Barad's (2007) agential realism (discussed below).

Here we link *perezhivanie* to *becoming*, a term we have chosen to signal an expansive focus on change and its consequences. Becoming aligns with Bakhtin's (1981) and Voloshinov's (1986) accounts of processes of ideological becoming as both central to, and consequences of, situated activity (e.g., utterances, sign processes) and the emergence of typifications (speech genres, behavioral genres). Holzman (2017) argues that Vygotsky's theories and research were offered "not as a theory of mind, but as a theory of becoming," that he aimed to articulate "a dialectical conception of human development (the activity of becoming) and a dialectical methodology for studying it (tool-and-result)…." (p. 17). Barad's (2007) account of agential realism is grounded in *intra-action* and *mattering* (discursive and material), terms coined to signal that all historical-material phenomena (including humans and spacetime) are constantly *becoming* in moments. Haraway (2016) uses *becoming-with* to articulate a biologically-grounded account of *sympoiesis* (making-with), which she describes as "a word proper to complex, dynamic, responsive, situated, historical systems…a word for worlding-with, in company" (p. 58). Becoming is also central to a flat CHAT perspective (Prior & Olinger 2019; Prior & Schaffner 2011; Smith & Prior 2020) that argues moments, lives, and worlds are rhizomatically assembled (Latour, 2005), intra-active (Barad, 2007), and dialogic (Voloshinov, 1986). To resist accounts of learning as intentional transmission of narrow bits in certain spaces, we also align with a focus on *lifespan becoming* (Erstad et al., 2016; Zittoun et al., 2013). In short, we draw on cultural-historic, dialogic, sympoietic, and intra-active frameworks to understand becoming[3].

In this article, we first articulate our theoretical framework for understanding intersections of *perezhivanie* and becoming. Next, we describe our methodological framework for analyzing these dynamic phenomena. We then illustrate our theoretical-methodological approach through four, quite different, empirical examples: a lab group in a university physics class doing and writing up an experiment, a former minister's years-long trajectory away from religious belief and through mental health crises, the practices of a sustained social justice program at a university, and discursive research (examining intersections of personal life, media representations, and public policies) to understand social expressions of age and aging in Brazil through one man's experience of surviving a stroke. Finally, we

[3] Many of the sources we cite discuss processes of becoming in conventional terms (learning, development, socialization, enculturation). The problematic entailments of terms like "learning" (i.e., narrow, individualistic, cognitive framing, often centered on one-way transmission of the social to the individual) have often been challenged by adding modifers and/or attempting to re-define the meanings. For example, Lave and Wenger (1991) defined "situated learning" as participation in social practices, and Engeström (1987; Engeström & Sanino, 2010) defines "expansive learning" as transformations of activity systems as they reorganize to overcome contradictions. Accounts in CHAT (see Scribner, 1985; Cole, 1996) have also referred to different scales of genesis (phylo-, socio-, onto-, micro-, meso-), offering another terminological framing for learning, development, and becoming. However, our sense is that typical entailments of everyday models slip back in as these reformulations and redefinitions are taken up and circulate.

consider implications of these four cases for understanding and designing moments of *perezhivanie* and becoming.

A theoretical framework for *perezhivanie* and becoming

As our group met over two years and read a wide range of literature on *perezhivanie*, we were repeatedly struck by an uneasy weaving between theoretical binaries: intra-psychological or external perspectives, affect-only or broader notions of experience, language-centric or semiotic framings, and particularly persons as distributed and neurodiverse or as autonomous and normative. The dynamic whole of embodied persons and sociomaterial environments emerging in moments of activity often seemed to be fractured and channeled into partial notions (e.g., personhood, emotion, agency) as researchers pushed to foreground what (like affect and the whole person) had been missing in CHAT. Glimpses of complex, dynamic flows of *perezhivanie* and becoming often seemed rare as conventional categories and ways of narrating persons and societies disrupted conceptualizations forged with more radical aspirations.

To develop a fluid ontology of moments that can address Lemke's key questions of how moments add up to lives and social life, we theorize *perezhivanie* as a ubiquitous dimension of human existence and activity (not an isolated process that can be turned on/off or something we are trying to create); as fundamentally material-semiotic (not limited to specific modalities or resources, not representational or ideal); as flat, dialogic, rhizomatic assemblage (not abstractly governed, static, or anchored in given spatial-temporal scales); as fully embodied sociomaterially, biologically, and ecologically (not idealized or metaphorical, not partial or limited); and as a matter of emergent, intra-active becoming (not isolated, settled learning). Our theoretical framework is grounded in a dialogic semiotics that entangles situated action with a flat account of cultural-historical becoming (e.g., Agha, 2007; Bakhtin, 1986; Linnell, 2009; Prior & Hengst, 2010; Voloshinov, 1986), in dynamic theories of embodiment that unite material environment and biology (e.g., Barad, 2007; del Rio & Alvarez, 2007; Hutchins, 1995; Varela et al., 1991), and in a bio-ecological notion of rich environments that highlights meaningful complexity, individual optimization, and voluntary participation as central to health and development (Hengst, 2020; Hengst, Duff, & Jones, 2019). In the next three sections, we consider how each of these inform claims about how *perezhivanie* and becoming contribute to an ontology of moments.

Perezhivanie emerges in flat, co-genetic, dialogic moments of semiotic becoming

Affective intensities have been identified as a key link between situated experience and becoming. For example, focusing on literate activity, aligning with rhizomatic frameworks attentive to movements and affective intensities (Deleuze & Guattari, 1987; Massumi, 2002), and critiquing the rational, representational uptake of multiliteracies (New London Group, 1996), Leander and Boldt (2013) argue:

> A nonrepresentational approach describes literacy activity as not determined by past design projected toward some future redesign, but as living its life in the ongoing present, forming relations and connections across signs, objects, and bodies in often unexpected ways. Such

> activity is created and fed by an ongoing flow of affective intensities that are different from the rational control of meanings and forms. (p. 36)

Although we also embrace flat, rhizomatic frameworks (Prior & Shipka, 2003; Prior & Schaffner, 2011; Smith & Prior, 2020) that highlight affective intensities, we join González Rey (2011, 2017), Veresov (2017), and Jornet and Roth (2016) in arguing that *perezhivanie* certainly indexes but is not reducible to affect. Arguing against translating *perezhivanie* into English as emotional experience, González Rey (2011) describes *perezhivanie* as a matter of environmentally-situated symbolic as well as affective processes.

We view *perezhivanie* not as a special kind of experience, but as fundamentally indexing the dialogic character of *all* experience (Linell, 2009; Voloshinov, 1986). We understand the sparkle moment in our opening research vignette as an embodied fusion of affective, indexical, intra-actional, and historical intensities. Such intensities can arise in quiet, routine moments as well as in moments of marked drama or trauma. Critically, we focus on intensities not because they are the *signature* of *perezhivanie*, but because they relate to the ontological *consequentiality* of *perezhivanie* in trajectories of *becoming*, in how moments add up to lives and social life as such.

Accounts of learning and coordination have often relied on basically Platonic architectures, where some idealized human, social, or cognitive entities (e.g., universal language competence, shared norms of a community, cognitive schemata) govern human knowing, being, and doing. In contrast, in taking up Lemke's (2000) questions of how "moments add up to lives" and "our shared moments together add up to social life as such" (p. 273), we start from Voloshinov's (1986) radical argument that "language is a purely historical phenomenon" (p. 82) and draw on flat, rhizomatic accounts of material-semiotic phenomena (e.g., Foucault, 1977; Haraway, 2016; Latour, 2005), on CHAT accounts of activity and learning/becoming (e.g., Cole, 1996; Engeström, 2006; González Rey, 2011; Holzman, 2017; Vygotsky, 1987; Wertsch, 1991), and on Barad's (2007) account of *intra-active* mattering as *entangled*, a term coined to signal that all material phenomena (including humans) are constantly becoming. Rejecting Platonic government leads us to a flat CHAT architecture for laminated assemblage (Prior, 2018; Prior & Olinger, 2019; Prior & Schaffner, 2011; Smith & Prior, 2020).

What does an ontology of moments look like that makes a fundamental break with Platonic architectures, that sees coherence and pattern as products of concrete, historical-material moments rather than of top-down governors (whether imagined, like the notions of culture and language, or concrete, as in national and institutional executives)? Throughout their work, Latour (2005) and Foucault (1977) hammered home the argument that even concrete governors need to assemble and sustain spatially and temporally dispersed apparatuses (human and non-human) to effect their directives: how much more so the fictional governors of macro-sociological theory? Articulating a “thick-now” that rejects abstract notions of time as empty uniform linearity, Barad (2017) quotes their earlier observation:

> It is not merely that the future and the past are not 'there' and never sit still, but that the present is not simply here-now. Multiply heterogeneous iterations all: past, present, and future, not in a relation of linear unfolding, but threaded through one another in a nonlinear enfolding of spacetimemattering, a topology that defies any suggestion of a smooth continuous manifold. Time is out of joint. Dispersed. Diffracted. Time is diffracted through Itself. (Barad, 2010, p. 244)

We argue that any historical-materialist account should be flat, rejecting reliance on bigger-than-life, abstract, idealized macro-actors that govern the world from transcendent positions (even transcendent systems stripped of divine authority). Nevertheless, abstract actors like named cultures, nations, institutions, activity systems, and communities have continued to occupy central governing roles in CHAT accounts. A flat framework aims instead for a purely historical accounting of becoming as dispersed, diffracted, dialogic moments of activity (e.g., Barad, 2007; Foucault, 1977; Latour, 2005; Voloshinov, 1986).

A central sticking point seems to be how to conceptualize coordination, communication, and recognizable patterns of practice as qualities that can emerge from a flat architecture. To account for even limited coherence, Lemke (2000) invokes circulations of semiotic artifacts that stitch together temporal scales via heterochrony, as products of multiple times interact in a moment. However, we would argue that the cohesive power of artifacts depends critically on co-genesis, on histories of association and co-presence as well as quasi-stable needs (e.g., food, sociality, security) and contexts (e.g., diurnal cycles, multi-species ecologies, seasonality) that generate relations of becoming-with (Haraway, 2016). Prior (1998) argued that co-genesis in this sense is critical to understanding how communication and coordination are possible without a theory of shared, idealized knowledge or practices, describing co-genesis as "the co-evolution of people, tools, and worlds" that "creates not shared culture, but affordances for alignments in what Rommetveit (1985) identified as 'pluralistic, only fragmentarily known, and only partially shared' worlds" (p. 277). Building off of Bakhtin's (1986) account of utterance as fundamental and genre as a secondary relation among utterances, Prior (1998) argues that Hutchins's (1995) account of functional systems (dynamic assemblages that distribute cognition and action across people, tools, and environments) should distinguish between situated and typified functional systems, that cultural-historical co-genesis is key to how "situated functional systems align with other instances to form typified functional systems" (p. 186), and that such co-genetic "functional systems are the unit of development, not individual and isolated persons or tools" (p. 278). Co-genesis is a boundary-crossing phenomena: the genesis of artifacts and practices routinely crosses culturally categorized domains, as when Roozen (2020) traces how an engineering student's facility with graphic tables arose from doing logic puzzles, from home scheduling practices, and from fan fiction writing as well as from schooled work with tables. The complex web of co-genetic and emergent processes calls for attention to dialogic *resonances* across chains of moments rather than simple causal pathways (Stornaiuolo et al., 2017).

An ontology of moments centered on becoming needs to consider the bio-cultural-historical weight of environments and practices (see relevant frameworks in Foucault, 1977, Hutchins, 1995, Tsing, 2015). Latour (2005) notes that in situated moments "a bewildering array of participants is simultaneously at work…dislocating neat boundaries in all sorts of ways, redistributing them away and making it impossible to start anywhere

that can be said to be 'local'" (p. 202). Latour argues a situated interaction is never isotopic (as its elements come from many places), never synchronic (as its elements come from many historical trajectories), never synoptic (with participants, people and things spread out in time and place), never homogeneous (as interactions weave together many different kinds of elements), and never isobaric (with many different pressures at play). We take up Latour's notion that different pressures of heterogenous elements from diverse trajectories of spacetime impinge dynamically on moments as the basis for our thinking about the role of bio-cultural-historical weight in becoming.

Dialogic, rhizomatic assemblage generates a heterogeneous *lamination* of histories, a *heterochronicity* within moments (Hutchins, 1995; Lemke, 2000). Lamination then is a ubiquitous outcome of ongoing assemblage, of intra-active becoming in Barad's (2007) sense, as multiple histories converge at moments, intra-actively becoming and spinning out consequentially to later moments. Such moments are fundamentally matters of embodied semiosis (e.g., Peirce, 1998) as articulated in biosemiotic frameworks that track material-semiotic processes across biological as well as spatial and temporal scales (e.g., Maran & Kull, 2014; Salthe, 1993).

Embodiment entangles heterogeneous material and biological becomings

If we want to articulate a unit of analysis that fuses person and environment (not simply coupling them), typical categories of personhood are another sticking point. Drawing on Vygotskyan traditions that highlight internalization, externalization, and tool use, Hutchins' (1995) account of distributed cognition aimed to soften the boundaries between *the person* and the environment (other persons and things), together understood as assembling dynamic *functional systems*. We have drawn on Hutchins' generative accounts of distributed cognition and functional systems; however, simply softening the boundaries between person and environment tacitly reinforces the original binary categories so that common conceptualizations of the autonomous mind and person are likely to get smuggled back in. A biologically grounded perspective on the embodied mind begins to challenge those conceptualizations, as it takes the whole body (not the brain-in-a-vat) engaging with the environment as the site of cognition and learning and highlights, for example, the critical roles of the gut microbiome in brain functioning (Stewart et al., 2010; Varela et al., 1991).

Other recent biological frameworks offer yet more radical reworkings of embodiment.[4] From a biological perspective, typical notions of *the person* as a stable and unified individual organism are entrenched ideological fictions, credited with greater coherence, stability, and purity than is warranted. The image of a stable, fixed-at-birth genetic code offering a blueprint for our individual becoming is rapidly unravelling as knowledge of genetics expands. Not only does epigenetics mean that experiences across the lifespan affect gene expression significantly, but basic genetic processes transform the genomes in our cells (somatic mosaicism), so that by adulthood no two cells in an individual brain

[4] Vygotskyan and CHAT frameworks have generally relegated biology to phylogenesis (the historical evolution of species, particularly focused on humans) and the affordances of that history. Biology from that perspective has typically been treated either as a pre-condition, a biological affordance, for the emergence of human activity or as a fixed framework repeatedly recruited to support negative racial, ethnic, and class ideologies. Recent formulations of holobiont symbiotic perspectives and more complex biological processes that we discuss here offer a perspective on biology that is more emergent, situated, and open to transformation.

may share exactly the same *genome* (Paquola et al., 2016). Muotri and Gage (2006) suggest this genetic heterogeneity is key to the complexity of human cognitive functioning and consciousness. Neurodiversity in this sense is not simply a political-ethical stance to empirical differences among people, but a fundamental characterization of individual brains. In addition, biologically, each of us is already a community: only roughly half of the cells in the envelope of our bodies are *homo sapien*, the rest being bacteria, archaea, viruses, and eukaryotes like protozoa and fungi (Shapiro, 2019). Critically, this human microbiome is dynamic, sociomaterially varied, and consequential (e.g., we cannot survive without it), leading some biologists to reconceptualize bodies as holobionts (hosts plus their microbiomes) and *holobionts* rather than species as the basic unit for evolution (Bordenstein & Theis, 2015; Haraway, 2016, Margulis, 1991). If we take fungi and lichens as key model organisms for biology (Sheldrake, 2021) and center the role of symbiogenesis in evolution and life (Gilbert, 2019; Margulis, 1991), the very notion of idealized (pure) species governed by genetic codes (yet another materialization of idealized Platonic architectures) is decentered, replaced by an emergent, historical-materialist biology of becoming-with (Haraway, 2016).

Beyond the (holobiont) organism, del Rio and Alvarez (2007) have noted how the work of early ecofunctional biologists, particularly Von Uexküll, influenced Vygotsky's conceptualizations of developmental environments. Discussing Von Uexkülls's (1982) generative notion of *umwelt* (the small worlds each organism inhabits, perceives, and acts on), del Rio and Alvarez highlight that *umwelt* is "not a background or scenario to be passed through, like a hotel room, but a flexible habitat that is occupied and remade, and on which each organism leaves its impression" (p. 285). Acknowledging the great value of Von Uexkülls's argument that organisms like ticks and worms are knowing subjects engaged in sensuous activity that makes worlds, Tsing (2015) points to three critical limits of such individualized "bubble worlds" (p. 156) in tracing ecological webs of interspecies coordinations across time and place:

> First, rather than limit our analyses to one creature at a time (including humans), or even one relationship, if we want to know what makes places livable we should be studying polyphonic assemblages, gatherings of ways of being. Assemblages are performances of livability.... Second, species-specific agilities are honed in the coordinations of assemblages...multispecies attunements in which each organism comes into its own.... Third, coordinations come in and out of existence through the contingencies of historical change. (Tsing, 2015, p. 157-58)

Umwelten then emerge as multispecies *polyphonic assemblages* in worlds that are uncertain, unpredictable, surprising, and precarious. We argue that theories of *perezhivanie* should be both *accountable*, as Hasson, Egidi, Marelli, and Willems (2018) suggested, to remarkably complex biological processes (rather than following psychological traditions of simply imagining blackbox modules in the brain) and *grounded* in dynamic entanglements of holobiont bodies with evolving ecological niches.

Rich environments have powerful consequences for becoming

The fundamental intra-active fusion of environment and organism is evident as well in the powerful consequences of rich/enriched or restricted environments for trajectories of becoming. Hengst, Duff, and Jones (2019) offer a review of foundational work on

environmental enrichment from the animal literature, relate it to sociocultural theories of learning and development in humans, and propose a framework that links rich communicative environments to neural plasticity (the way brain structure and function are continuously shaped by experiences across the lifespan). Hebb (1949) first observed that rats raised as pets in his home were, as adults, superior in solving maze tasks compared with rats raised in the typical restrictive environments of lab cages, concluding that "richer experiences" during development made his pet rats "better able to profit by new experiences" (pp. 298-299). Hebb's informal observations stimulated a vast literature on manipulations to enrich environmental housing conditions for laboratory animals that has robustly confirmed that learning abilities and cognitive, sensorimotor, and perceptual capacities are improved by exposure to rich environments during development (e.g., Alwis & Rajan, 2014). It soon became clear that *environmental complexity* does not have effects only on the cortex or only during early brain development, but rather affects neuronal structure in diverse brain regions across the lifespan, including after brain injury (e.g., Churchill et al., 2002; Radabaugh et al., 2017).

Reviewing the research on lab animals, van Praag, Kempermann, and Gage (2000) emphasized two overlooked characteristics of enriched environments: the *voluntary* nature of activities (animals choose, for example, to exercise or not) and the importance of *optimization*, which can be seen, for example, in the detrimental effects of both too little social contact (isolation) and too much (over-crowding). It is important to underscore that animal research does not argue that enriching housing is simply a matter of maximizing complexity and intensity of stimulation. Historically, research on the effects of environmental complexity on humans has focused on extremes—such as studies of social isolation and sensory deprivation (e.g., Hebb, 1949; Solomon et al., 1961). Strikingly, individuals who experience sensory deprivation do not become bored, but quite rapidly experience radically altered consciousness, what has been described as mystical or schizophrenic-like states of consciousness that sometimes persist after typical sensory inputs are restored. The rapid, profound, effects of sensory deprivation are a remarkable demonstration that human consciousness itself is fundamentally distributed—constantly entangled with the environment.

Translating these findings for clinical practices, Hengst, Duff, and Jones (2019) define *rich communicative environments* around three core dimensions: meaningful complexity, voluntary participation (opportunities to agentively engage in personally relevant and meaningful activities), and experiential optimization (aligning the quality of communicative environments to the needs and preferences of specific individuals in specific settings, cf. Csikszentmihalyi, 2014). These dimensions can also characterize *restrictive environments* as ones that might be highly repetitive or chaotically complex, be coercive, and not be optimized for individuals and/or settings (Hengst, 2020). This bio-ecological model of rich environments (centered around meaningful complexity, agency, and individual optimization) offers both a key metric for understanding *perezhivanie* and becoming and a design framework for transdisciplinary realizations of ethico-onto-epistemological practice.

A methodological framework for perezhivanie and becoming

Aligned with the long-standing Vygotskyan linkage of theory, methodology, and social action, we begin from an ethico-onto-epistemological transdisciplinary stance (Barad, 2007) attuned to historical becoming. Drawing on Barad's (2007) account and broader recognitions of the inherently situated and interested character of knowledge, ethico-onto-epistemological frameworks (e.g., Mainardes, 2022; Stetsenko, 2020) have articulated the integration of being-doing-knowing, the centrality of socio-political ethos to projects of knowing, and the importance of foregrounding social consequences and visions in the design, implementation, and uptake of inquiry. From a flat materialist feminist perspective, Mol (2002) argued for research in the human sciences, where "knowledge is no longer good in as far as it faithfully represents some object *as it is*…" and thus "does not draw its worth from *living up* to reality," arguing "what we should seek, instead, are worthwhile ways of *living with* the real" (p. 158).

Barad (2007) embraces Bohr's quantum theory that posits actual ontological uncertainty (quite distinct from Heisenberg's familiar epistemological uncertainty principle that takes acts of observation to necessarily interfere with reality). Barad (2007) centers *mattering*: "The world is an open process of mattering through which mattering itself acquires meaning and form through the realization of different agential possibilities. Temporality and spatiality emerge in this processual historicity...." (p. 141). An enduring consequence of Platonic ideologies is the split between ideal and real and the privileging of the ideal, disembodied, often spiritual. Linking the material and discursive senses of "matter" while resisting their reification as a simple noun, Barad's (2007) account of *mattering* rejects both the split and the privileging, offering instead worlds that are unstably embodied and constantly becoming in material historical processes. The epistemological consequences of this quantum ontology do not negate scientific projects of knowing the world, but do reject optical metaphors where representation acts like a mirror, reflecting neat choreographies of knower, knowing, and known, each separate and independent.

In place of mirrored reflection, Barad's (2007) agential realism argues for methods of *diffraction*, which insists that the knowing and the knower are immersed in and entangled with the known, together constituting the *phenomenon* being investigated. Diffraction is performative (meaning that "subject and object do not preexist as such but emerge through intra-actions"), is grounded in an entangled ontology, and aligns with an onto-epistemology where "knowing is a material practice of engagement as part of the world in its differential becoming" (p. 89).[5]

[5] As Barad (2007) details, in classical diffraction experiments in physics, light or other material passes through some slit(s) or encounters other barriers, which then produces a pattern of light and dark bands radiating from that barrier, bands that mark the superposition of waves. Diffraction experiments were critical to identifying the wave-particle duality of light. Diffraction experiments soon also identified not only wave-like behavior in various forms of matter (e.g., electrons), but also quantum entanglement effects not predicted by interference-only accounts of diffraction. For Barad then, diffraction is not only central to the emergence of quantum mechanics, but also to identifying fundamental epistemological flaws in representational accounts where words and other signs are understood as reflections of an independent world.

This ethico-onto-epistemological stance plays out in our research designs, analysis, and reporting. For example, accountability to the complex dynamics of biological phenomena orients us to design, analyze, report, and imagine dynamically entangled material-biological processes rather than simple models constructed around purified cultural categories. It plays out in our research as we seek to encourage the long arc of socio-political-moral life to "bend toward justice" (King, 1965) in selecting research questions and sites, conducting research with interested participants, engaging in reflexive analysis, and sharing/using findings. Ethico-onto-epistemology invites participatory and praxis-centered research (e.g., action research, design experiments, change labs, transformative activist perspectives), recognition of inquiry practices as everyday activities, and attention to/intervention in sociopolitical histories, stances, and chains of action (Bang & Vossoughi, 2016; Engeström & Sanino, 2010; Guiterrez, 2018; Hengst, 2020; Perrin, 2012; Stetsenko, 2017; Vianna & Stetsenko, 2014). In this section we outline a methodological framework for studying *perezhivanie* and becoming and then introduce methods for the four research sites that illustrate our transdisciplinary frameworks.

Perezhivanie and becoming as methodological lenses

Taking the lens of an ontology of moments to trace human becoming, *perezhivanie* focuses our attention on *consequentiality*. The challenge for situated analysis then is to identify analytic and conceptual lenses that bring into focus affective, indexical, intra-actional, and historical intensities; that illuminate co-genetic affordances emerging from the bio-cultural-historical *weight* of environments and practices; and that track dialogic *resonances* across chains of moments.

Methodologically, given the central themes of experience and personhood, research has often articulated *perezhivanie* and related notions of affective intensity (e.g., Leander & Ehret, 2019) through biographical cases (e.g., Jóhannsdóttir & Roth, 2014) or close attention to situated moments (e.g., Hollet & Hein, 2019). In these studies, *perezhivanie* and affective intensity tend to be identified either as reported (e.g., participant self-reports during interviews or unsolicited accounts observed in talk, text, or other media) or as recognized (e.g., affect taken by the researcher as obviously present in shared videos or transcripts of interaction). We worry that these you-know-it-when-you-see/feel-it representations are particularly vulnerable to tacitly reinscribing folk theories of the autonomous self and, more generally, that such epistemological opaqueness is likely to skip over the textured moment-ness of becoming and underspecify how moments emerge with and across sociomaterial spaces.

As we seek to move beyond a reliance on report and recognition, we draw broadly on familiar ethnographic methods. In data collection, when possible, we seek to record (video, audio, detailed field notes) observations and interviews to trace the embodied, emergent, and sedimented character of *functional systems* (not isolated individuals). Repeated (longitudinal) data collection representing multiple perspectives (including those of researchers) is critical for analysis of the bio-cultural-historical weight and resonance of moments. In our data analysis, identifying marked moments of affective, indexical, intra-actional, and historical intensity involves diffractive interpretations of fleetingly emergent phenomena as well as highly recognizable categories. Such marked moments become nexuses (Scollon, 2001) from which to trace trajectories of becoming as they resonate across materialities, activities, and timescales. For example, that moment in our opening vignette can be systematically analyzed by identifying Tannen's (2007) *involvement*

strategies (e.g., savoring, conversational repetition, constructed dialogue), by tracing *interactional synchrony* as embodied coordination (e.g., Kendon, 1990; Prior, 2020), by tracking moment-to-moment *social accommodation* (Coupland, 2008), by articulating *flow experiences* through measures of challenge, interest, skill, joy, anxiety, boredom, and loss of a sense of time (Csikszentmihalyi, 2014), and by illuminating *laminated indexical fields* (e.g., Goffman, 1981; Hanks, 1990; Hengst, 2020; Stukenbrock, 2012). These frameworks each and jointly offer systematic ways of grounding claims of intensity critical to understanding the consequentiality of moments (Prior, 2018). These methods, we argue, support dialogic analysis of material semiosis across timescales; illuminate sedimented affordances of artifacts, bodies, practices, and environments; and offer systematic ways of linking *perezhivanie* to becoming. Our goal here is not to propose, or to assert we have followed, a research template that ensures epistemological soundness, but instead to enact a diffractive humility (Barad, 2007) as we work to make our research accountable to embodied becoming, to our interpretive processes and their contexts, and to the diverse goals and aspirations of the participatory processes.

Methods for our four data examples

The four data examples illustrate our working out of this ethico-onto-epistemological approach to studying *perezhivanie* and becoming diffractively across quite different research studies, timescales, and sociomaterial contextualizations. All four are grounded in larger datasets that were praxis oriented and involved sustained collection of multiple types of data. To foreground situated researcher-participant positionings, each example will be presented in first person. The examples presented here are anchored in particular moments but also foreground different temporal and spatial scales: the first (Kovanen's) focusing on microgenesis, the second (Ware's) on ontogenesis, the third (Turnipseed's) on co-genetic links between onto- and meso-genesis, and the last (Mazuchelli's) on entanglements of cultural-historical, onto-, and meso-genesis (see Cole, 1995; Hengst, 2020; Miller et al., 2003; Scribner, 1985; Vygotsky, 1997; Wertsch, 1985).

As part of a transdisciplinary action research project seeking to improve writing instruction across university STEM disciplines, Kovanen began working with an innovative physics lab course designed to invite students to experience scientific processes not as given designs with set and definite answers but as matters of collaborative work, ongoing design, and uncertainty. To understand how student groups were collaborating to design, do, and write up the labs (all in single class sessions), he collected 10 hours of video- and audio-recordings of lab groups over two semesters, 200 co-authored lab reports (all Google Docs, some with versions), and instructor feedback on student writing. The video data support analyzing the embodied and distributed acts of doing science and school. Students routinely worked through moments of uncertainty—not only in designing data collection or making sense of findings but also in calculating uncertainty and identifying potential sources of experimental error. The example reported here traces a lab group's struggles with affordances of their tools as they measured physical phenomena and reported their findings.

Ware is engaged in a broader ethnographic study following participants in The Clergy Project (TCP), a nonprofit organization that aims to assist priests, imams, pastors, nuns, and other religious workers who have lost faith and either left that work or, less commonly, are still practicing but concealing non-belief. Taking up what Stornaiuolo et al. (2017) describe as an "inquiry stance" (where researchers follow important emergent

threads rather than predetermined pathways), the research particularly examines how literate activities might shape unbecoming religious and becoming secular. Informed by ethnographic case studies with 20 people (including over 75 hours of video/audio recorded interviews and around 2000 pages of texts/artifacts), the example reported here focuses on one participant, Joiya, over two years of ongoing inquiry. Taking a co-researcher role (Roozen & Erickson, 2017), Joiya actively participated in defining the focus and practices of the study. She shared hundreds of pages of writing and artwork produced over 10 years that became the base for multiple interviews and interactions (currently amounting to more than 12 hours of video-recorded interviews and extensive written exchanges).

Turnipseed is conducting a comparative ethnographic study across several social justice higher education programs in the U.S. As research sites, the programs offer possibilities for understanding how students engage in literate practices to become agents of social change within institutions that have benefitted from and upheld systems of white supremacy and settler colonialism. Here Turnipseed focuses on University of Colorado Boulder's INVST Community Leadership Studies program. After hearing Sabrina[6], the program's director, speak about INVST at a conference and learning it had persisted for decades and garnered stable institutional support despite missions and governance ostensibly counter to those of the university, Turnipseed began an ethnographic and historiographic study of INVST. She conducted and video-recorded individual, text-based interviews with Sabrina (who had also studied and taught in the program) and three students Sabrina put her in contact with based on those students' own interests in ethnographic research. Each student shared texts they had composed for academic or community projects they deemed important to their development and spurred (directly or indirectly) by their work in INVST. Turnipseed also collected and analyzed public-facing institutional documents and published historical texts.

Mazuchelli (2019) has conducted research in Brazil on social expressions and experiences of age and aging as a complex phenomenon—unequivocally biological, subjective, cultural, and historical. To signal this complexity and simultaneously index age, aging, and aged, she has termed the process "ag(e)ing" (Mazuchelli, 2019). Her research investigates relationships among the circulation of ag(e)ing stereotypes in commercials (broadcast between 2007 and 2017); the reported experiences of her participants, some diagnosed with acquired cognitive-communication disorders (e.g., resulting from strokes); and the participants' discourse practices (particularly around word-finding difficulties). Drawing on her linguistic analysis of the commercials, Mazuchelli conducted semi-structured interviews with eleven volunteers (with and without language disorders) who lived by themselves, with their families, or in a non-profit care home in Campinas, Brazil. The interviews, conducted in Portuguese, were video-recorded and averaged 30 minutes. They were discursively transcribed (Hengst, 2001) and have also been glossed and translated into English for this example. The case presented here focuses on Paulo[7], who had a stroke in 2009 that left him with aphasia. Mazuchelli first met Paulo in 2010 and interacted with him through a center that aims to enrich the communicative lives of people with aphasia after stroke. In 2017 Paulo began participating in her research.

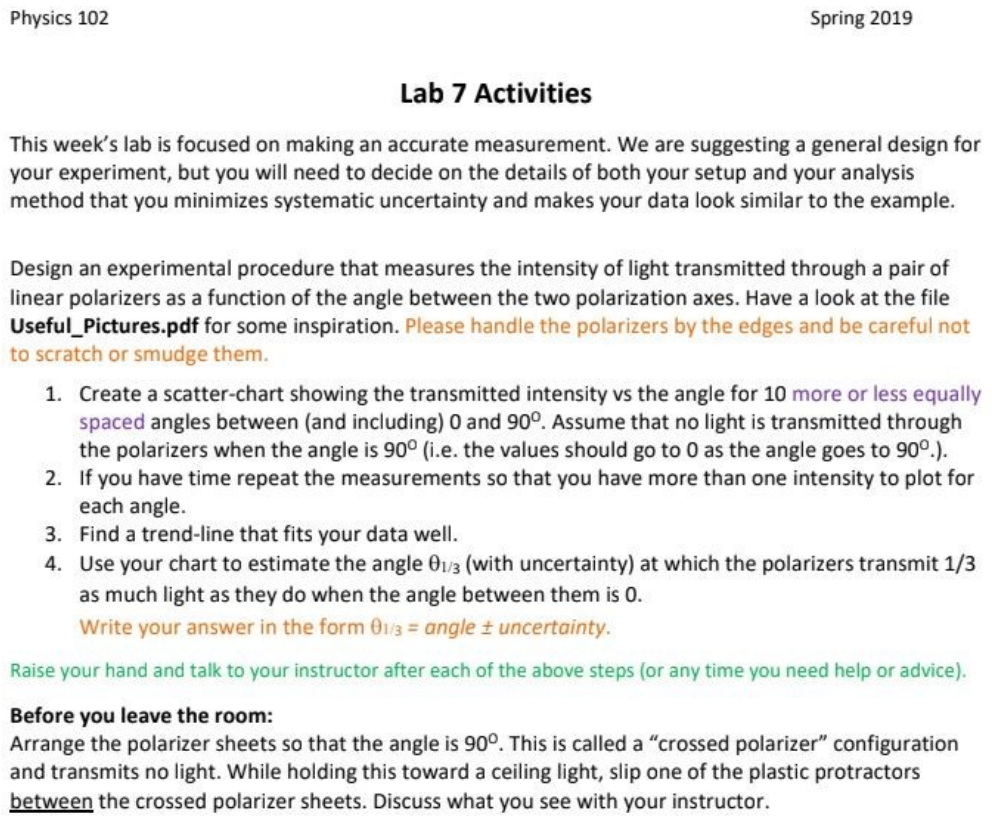
[6] Name used with permission.
[7] Participant's pseudonym.

Collaborating on writing in a physics lab: *Perezhivanie*, uncertainty, and becoming scientists

The first example focuses on a lab session of an introductory Physics course at a major research university in the United States. As part of a writing-across-the-curriculum initiative that seeks to improve writing instruction across STEM disciplines (Gallagher et al., 2020; Ware et al., 2019; Yoritomo et al., 2018), I (Kovanen) began working with the professor and his team to conduct action research on collaborative student writing in the labs that they were redesigning to emphasize collaborative activity and "cultivate students' abilities to think critically and solve problems in creative, flexible ways" (Ansell, 2020, p. 25).

To accomplish these goals, they had designed an instructional lab environment that facilitated opportunities for students to make decisions throughout the lab session. This format departs from traditional "cookbook" lab environments where students are provided instructions and procedures for data collection and analysis and are evaluated based on their ability to record correct answers. Instead, students must design experimental procedures, select equipment, and then co-author a report (1-2 pages) by the end of each lab period. Reports generally include an introduction that describes the purpose of the experiment; graphs, figures, and free-body diagrams; and a paragraph or two that interprets the results and explains areas of uncertainty and error. By giving students decision-making power and requiring them to account for their decisions, the lab format deliberately redistributes epistemic agency (Ko & Krist, 2019), aiming to develop students' critical thinking skills by structuring an environment to "practice confronting and making decisions" about their inquiry processes to generate flexible solutions in new situations (Ansell, 2020, p. 25).

In the lab sessions, students are provided with a variety of tools and objects to choose from as they design their experiment. In addition, students employ varied general tools, such as Google Docs (online word processing that affords co-writing) and cell phones with cameras to capture experimental set-ups. The vignette below traces the emergent and shifting saliency of affective, indexical, intra-actional, and historical intensities around lab work and how those intensities are subsequently remediated as lab report prose. I examine how working through frustration around disruptions in data collection becomes transformed into statements about experimental error in the lab report and highlight the importance of attending to situated, laminated semiotic performances across material and temporal scales of transformation—from intra-actional moments of talk and gesture to acts of inscription linked to becomings of the course and the students.



Physics 102 Spring 2019

Lab 7 Activities

This week's lab is focused on making an accurate measurement. We are suggesting a general design for your experiment, but you will need to decide on the details of both your setup and your analysis method that you minimizes systematic uncertainty and makes your data look similar to the example.

Design an experimental procedure that measures the intensity of light transmitted through a pair of linear polarizers as a function of the angle between the two polarization axes. Have a look at the file **Useful_Pictures.pdf** for some inspiration. Please handle the polarizers by the edges and be careful not to scratch or smudge them.

1. Create a scatter-chart showing the transmitted intensity vs the angle for 10 more or less equally spaced angles between (and including) 0 and 90^{O}. Assume that no light is transmitted through the polarizers when the angle is 90^{O} (i.e. the values should go to 0 as the angle goes to 90^{O}.).
2. If you have time repeat the measurements so that you have more than one intensity to plot for each angle.
3. Find a trend-line that fits your data well.
4. Use your chart to estimate the angle $\theta_{1/3}$ (with uncertainty) at which the polarizers transmit 1/3 as much light as they do when the angle between them is 0.
   Write your answer in the form $\theta_{1/3}$ = *angle ± uncertainty*.

Raise your hand and talk to your instructor after each of the above steps (or any time you need help or advice).

Before you leave the room:
Arrange the polarizer sheets so that the angle is 90^{O}. This is called a "crossed polarizer" configuration and transmits no light. While holding this toward a ceiling light, slip one of the plastic protractors between the crossed polarizer sheets. Discuss what you see with your instructor.

Figure 1: Assignment sheet for the instructional lab.

The situated intra-actions presented here are taken from a lab session in which students' main objective was to make accurate measurements (see Figure 1). Using two film polarizers and a protractor, students arranged the two polarizers in a series of angles (changing 10˚ with each measurement) and recorded the light intensity. After taking the measurements, students sought a trendline that best fit their data and made a data-informed prediction. Figure 2 shows the film polarizers arranged on a lab device's light sensor and a student using a protractor to change the angle of overlap between the two polarizers.

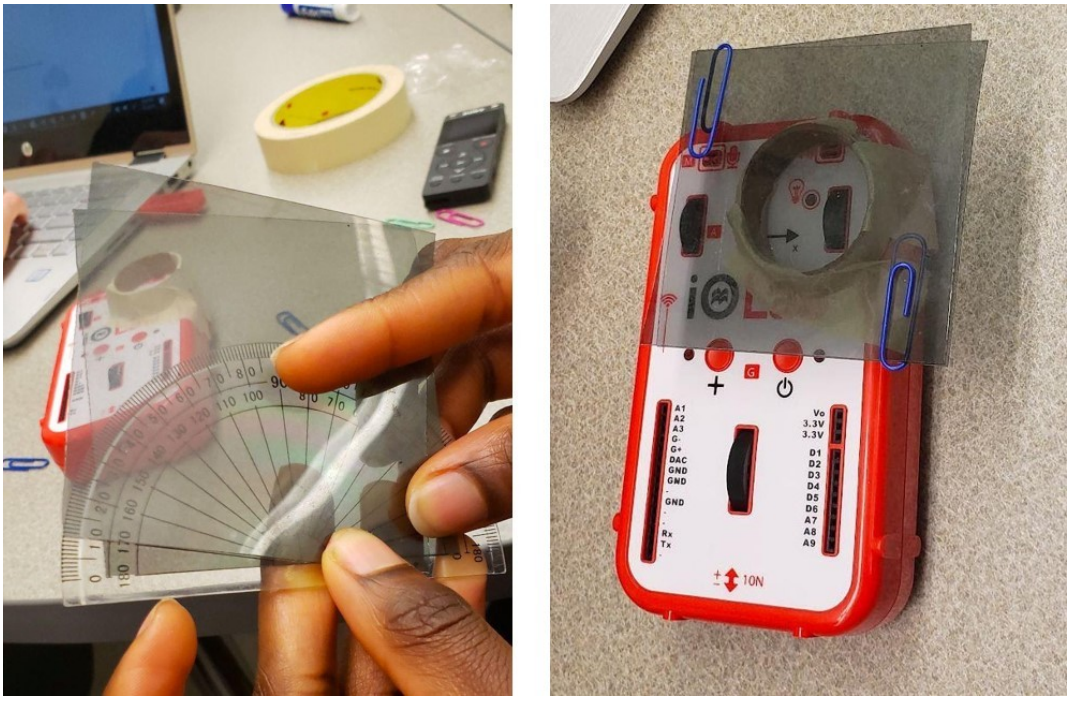


Figure 2: Student changing film overlap and example of films placed on measuring device.

After deciding on their experimental design (using the ceiling light as their main light source and paper clips as their method for holding the films in place) and taking the first few measurements (10˚, 20˚, and 30˚), the students (from left to right in Figures 3 and 4: Sophie, Arushi, and Ololade[8]) notice that something is "off." Between the time Ololade arranges the angle and the time it takes to move it to the light sensor to measure intensity, the films have shifted, and their angle of overlap has changed. This scene is demonstrated in Still 1 of Figure 3, where Ololade has picked up the films and is remeasuring the angle with a protractor. She notes that the films are adjusting themselves, and Arushi adds that the shifting films have changed the angle by about 10˚. The students discuss their strategy, and Sophie asks if they have been measuring it the same way each time. Then, in Still 2, Ololade begins to tap the films with her index and middle fingers, demonstrating the curvature because of how the films respond to the tapping. These curves present a problem for the group, who are trying to take measurements at consistent intervals, and for the light sensor, which reads the light intensity differently based on the gap between the two films.

[8] Student names are pseudonyms.

Still 1: Investigation

O: There must be something wrong.
S: What's wrong?
A: It keeps adjusting itself 10 degrees more than what we set it to.

Still 2: Tapping on the film

O: I think it's because of the* thingy*…the fact that it's not flat.
*tapping the film with index and middle fingers

Figure 3: Sophie(S), Arushi(A) and Ololade(O) investigate the source of their shifting films. (Arrow added to Still 2).

The students continue to work with the polarizers and, after some careful paperclip manipulation, finish the first round of measurements. While they are working on their second trial of measurements, the films begin to shift again. In the first image of Figure 4, after reading the output from the light sensor, Ololade exclaims, "No!" and mock weeps with her head in her hands. In the second image, Sophie suggests that they flip the polarizers around, and, in the third image, moves to pick up the polarizers to see if there is a noticeable gap between the films. Sophie's manipulation of the films prompts a cascade of intra-actional intensities, pictured in the fourth image, wherein Ololade and Arushi manipulate the films together, tinkering and trying out possible combinations of paperclips that might better hold the films in place.

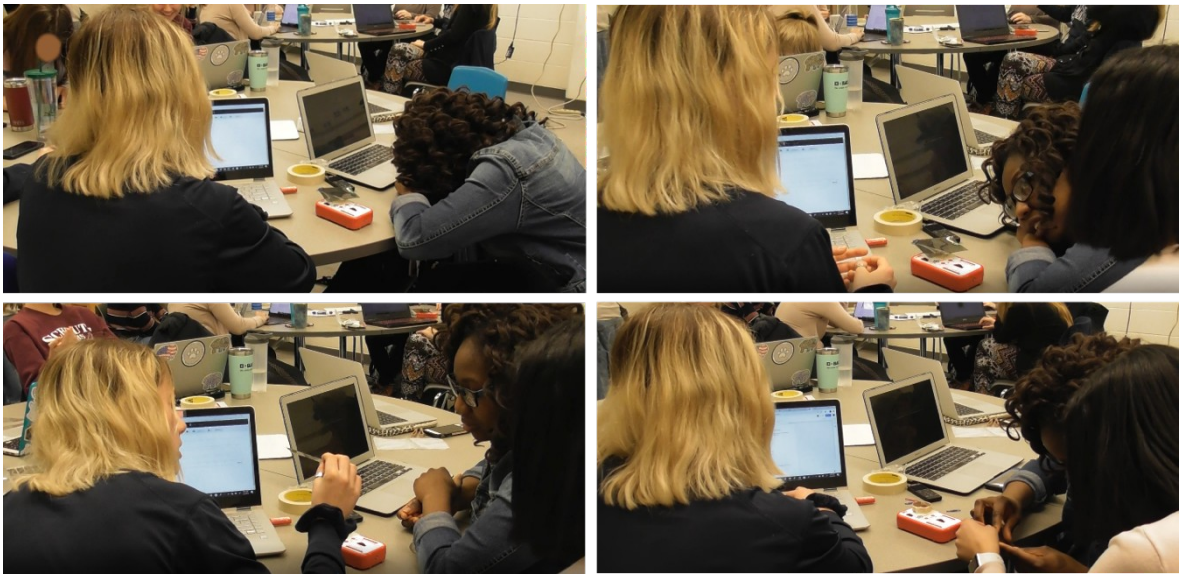


Figure 4: Four stills (over 30 seconds of intra-action) as Ololade mock-weeps in frustration over continued measurement problems and first Sophie and then Arushi and Ololade examine the film.

After some discussion about how to address the shifting films, the students decide to increase the number of paperclips on the films, moving from two to four. This decision provides Sophie, Arushi, and Ololade with enough stability in their films to complete the second round of measurements and find a trend-line that fits their data, an accomplishment the students celebrated with smiles and high fives. They then turn their attention towards their laptop computers as each student opens a draft of their lab report in Google Docs. Over the next 45 minutes, each student begins working on a section of the report, checking in with each other, the course instructor, and related course documents (e.g., powerpoint slides from a recent lecture, the lab report rubric) as they compose. Ololade writes the report's calculations of uncertainty, Sophie creates the trendline for the group's data and uploads it into the document, and Arushi writes the following section on "error":

> Error: Our experiment, like all others, is not free of error. In our data collection process, we noted several sources of error. First, we noticed that our polarization sheets were curved and therefore had to be paperclipped together to be secure. This curvature in the sheets is a huge source of error, as it prevented the angle from being accurately measured and later was not stable on the ring. We noted that when measuring the angle we kept the polarization sheets flat, but later when measuring the angle after the light intensity, we noticed that the angle was different. This discrepancy may exist due to the polarization sheets curving by themselves and altering the angle. Second, we also noticed that the polarization sheets were not completely clean, there were some fingerprint marks on them from previous use, and this can alter the amount of light going through, and affect the accuracy of the light intensity. At first, our iOLab device had a protective plastic sheet covering the front, including the light sensor. When measuring the light intensity with the protective sheet, the measured value was significantly lower than when the plastic sheet was removed. This sheet may have prevented the light from reaching the light sensor.

In this passage we see how the students transformed embodied affective and semiotic experiences (tapping on and manipulating the films, mock weeping, high fives) into a "distilled and cooled off narrative" (Miller et al., 2000, p. 236) framed as matters of "noting" and "discrepancy" in the report, tempering both positive and negative intensities in the written account of their lab activities.

The students' textual transformation of their experiences resembles knowledge production practices in professional science settings (e.g., Knorr-Cetina, 1981; Latour & Woolgar, 1986). Rather than fill in answers in a worksheet or notebook as part of activities meant to reduce complexity and uncertainty, students in this lab environment routinely grappled with meaningful complexity in a rich communicative environment where uncertainty is encountered and explicitly addressed as a requirement of the lab report. In this way, the faculty's pedagogical design of the lab environment affords students opportunities to meaningfully take up becoming scientists with epistemic agency—not divining universal principles of truth, but rather learning how to plan, problem solve, and work through frustration and disruption. By attending to how students intra-act with the heterogenous sociomaterial spaces of classrooms, with a semiotic ecosystem entangled with histories of experiences, intra-actions, and settings (Roth & Jornet, 2016), we can see how tracing functional systems, embodied actions, and semiotic intensities illuminates *perezhivanie* and the microgenesis of becomings.

Perezhivanie from belief to non-belief and recognizing bipolarity: Joiya's literate activity and becoming

For this example, I (Ware) draw from research with Rev. Joiya Martin. Her case illuminates "acrossness" of *perezhivanie*, showing how trajectories of *perezhivanie*, an inherent part of lifespan trajectories of semiotic becoming (Ware, 2022; Prior, 2018), indexically shape people's activity and ways-of-being in the world. Joiya's becoming Christian is a tale of immersion *across* all dimensions of her life. She reported being raised "far beyond evangelical." She received Christian homeschooling, attended Christian undergraduate and graduate schools, was ordained, served a few years in associate pastor roles, and became solo pastor of a Presbyterian church in the midwestern US. In 2010, less than a year into her career as solo pastor, Joiya experienced a bout of depression, was hospitalized, and diagnosed with *severe* type I bipolar disorder, compounded by anxiety and obsessive-compulsive disorders. Between 2010-2020, Joiya was hospitalized more than 40 times, particularly for mania which often precipitated moments of intensity around drastic mood cycling and suicidal ideation. In 2011, she created a blog in which she wrote nearly 140,000 words across hundreds of posts describing – and working over (Blunden, 2016) – the pain of her mental illness. While coping, Joiya also deconverted from Christianity.

Across two years of ongoing ethnographic work, Joiya and I found that her deconversion was inextricable from her bipolar diagnosis, a result of working over her past life experiences with faith, and semiotically re-mediating (Prior & Hengst, 2010) them as instances of mania. Through writing, Joiya came to see many facets of her life as deeply

tied to her diagnosis, and to understand that she had lived with bipolar for most of her life. "I blog about Bipolar Disorder," she wrote, "because I need to understand what I'm going through, and as a writer, I can process my thoughts and feelings best through words." Her blogging, then, became directive (del Rio & Alvarez, 2007) *perezhivanie*.

I read her blogs about "triggers" as particularly salient moments of consequential intensity and pain. Clinically, triggers refer to encounters with environments that spark dangerous shifts in mood. Joiya wrote "a trigger that starts the obsession, could just as easily cause a delusion that skips coping skills and plans suicide with the obsessive visions in my head." On May 22, 2011, Joiya composed a blog titled "Triggered: Church Diaries" immediately after experiencing an intense trigger at church:

> On the ride home the heaviness and pain were just bearable enough that I wasn't a danger to myself and others. I hoped writing out the blog post would help the pain go away so I wouldn't end up with thoughts of hurting myself. Writing helped a little yet mostly I just feel the pain next to me, and feel detached inside, instead of re-filled and whole, the way I feel after processing pain.

Blogging, then, was a nexus of semiotic, dialogic intensity with directive functions of processing triggers of pain (and the pain, itself) that came with attending church after her diagnosis. This post, written over a decade ago, is a residue of her dialogic semiotic process of working-over the pain caused by church environments. Strikingly here, she wrote using an embodied conceptual metaphor (Becvar & Hollan, 2010) to structure her orientation to pain, and her description is distributed spatially, as metaphorically a dark passenger sits beside her. Eight years later, we revisited the post using a method I call "dialogic animation" (Ware, 2022) for eliciting moments of intense semiosis. Participants read texts aloud, pausing to think-aloud about anything that comes to mind. Reflecting on the post (see Figure 6), Joiya offers a retrospective account of her *perezhivanie*, describing *working-over* pain in part through writing.

Affective intensities related to feelings and pain she experienced at the time she wrote the post – and that she seemed to feel again – can be seen both verbally and nonverbally in Figure 6. In panel 1, she tightened her facial expression as if to wince and paused for three seconds before noting that the pain would trigger suicidal ideation. She seemed to brace/wince when recalling (and again-living; see Blunden, 2016) pain she felt. In the second panel, describing church environments, she tightened and relaxed the muscles around her eyes, wincing, then closed them while uttering "…I'm going back into that feeling," keeping them closed through the word "spirituality." She did this almost as in meditation to manage again-living the pain here-and-now.

However, Joiya is not only managing affective intensities: in each panel she is also managing the intensities of multiply embedded and laminated indexical fields (Hanks, 1996; Goffman, 1981), intra-actional intensities of the interview, and historical intensities. In panels 1 and 2 when she recalls her deep sense of pain, she describes it as outside of her, as if experiencing another being present with her (cf. Hanks, 1996, on imagined participants). In panel 2, she traverses indexical fields by "going back into that feeling," bringing it to the present interaction. In panels 3 and 4, she juggles indexical fields as she

invokes histories of her affect, embodied here by closing her eyes. Panel 4 highlights the acrossness of *perezhivanie* as working-over: Joiya reports that she "wrote and wrote" and represents that writing in direct discourse, "is God not good…not powerful," as she rolls her eyes, moving her head in a counterclockwise circle, indexing the effort she put into understanding pain. The trajectory of *perezhivanie* figures indexically in the there-and-then as well as here-and-now of the intra-action. Panels 7 and 8 showcase indexical field intensities again around presencing. Where once she had experienced God as a close, present being, she re-mediated those experiences later as manic and not real, altering her indexical relationship to the histories of those experiences, which led over trajectories of *perezhivanie* to her becoming atheist. In panel 8, it seems that, having moved out of a discussion of pain, her face is markedly more relaxed as she offers a direct representation of her current stances and then sums up her re-assessment of earlier religious experiences.

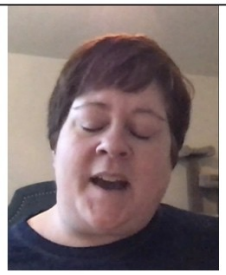
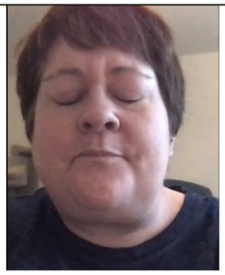
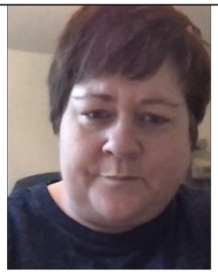
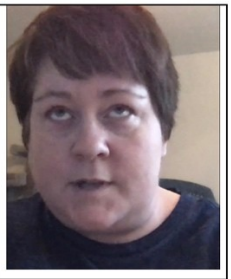
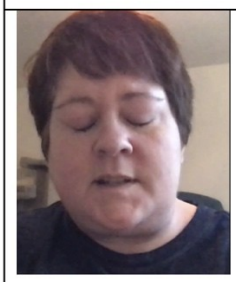
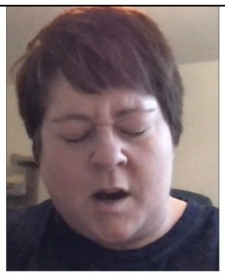
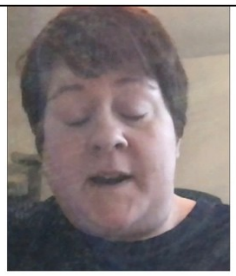
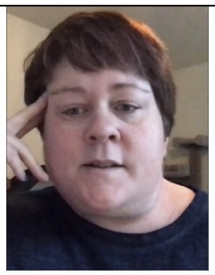
			
1) I would be driving home from church and it would just be so painful and it felt so tangible and so big, that it was, that it **had** to be outside of me, wasn't something I could contain. (.3) um, and it would trigger suicidal ideation and feelings,	2) just from being in the environment of a sanctuary and going through the liturgy…and so I'm going **back** into that feeling of it being just (.3) almost like spirituality was outside of myself for a while…I couldn't contain it anymore	3) …and writing was one of the ways to try to at least describe it even if I couldn't feel it. ((sigh)) um, but mostly spirituality brought **pain**. and, my spiritual journey is tied in with bipolar (.) journey, because two of the big factors that led to becoming an atheist,	4)…one was the problem of this pain, which I had studied and studied and **wrote and wrote** tons about the problem of suffering. you know, "is God not good? is God not powerful?" I did this as an undergraduate. I did it as a graduate student…
			
5) I had come to a certain understanding of it, that was pretty Buddhist… Just that suffering is…um, (.) dealing with being so close to **death** so often,	6) and the pain that spirituality would **cause** was so deep…, um, (.) that was a huge factor for deciding that there is no God…And then the secondary factor with that was during those first couple of years with bipolar, I was coming to terms	7) with all of the spiritual experiences, the feeling close to God, feeling almost raptured up into God's presence sometimes…realizing that some, if not all, were **manic,** and so there's a biological reason that I was having these…	8) I'm like "they were manic, these were not real." So…the great pain and then also just realizing that the spiritual experiences were manic, coming to an acceptance of that…led to becoming an **atheist**.

*Figure 6: Dialogic animation of "Triggered: Church Diaries." Words marked in **bold** denote moment of screen capture.*

This dialogic animation of Joiya's post illuminates the acrossness of *perezhivanie* about pain, as well as the embodied and indexical consequences registered as she intra-actionally invoked histories of experience and seemed to feel residua of the pain again. This interview can then be read diffractively (Ware, 2022) with other writing/artifacts, talk from interviews, etc., to trace resonances across data (Stornaiuolo et al., 2017) and their consequences for Joiya's becoming: her active work to live with bipolarity and without religious belief.

Sustaining and deepening INVST: *Perezhivanie* of a social justice education across generations in a colonial university

I (Turnipseed) center this example on the accounts of two of my participants: Sabrina, the program director of INVST, and Maria[9], an INVST student. Employing ethnographic methods to trace cross-generational, multi-scale moments across people as the co-genetic becoming of INVST's program and people, I aimed to illuminate the complex entanglements (Barad, 2007) within and around the program's human and nonhuman actors as they (re)assembled functional systems (Hutchins, 1995). Specifically, the methods shed light on the intra-action between multiple "nexuses" of activity including: (1) students' literate activity (Prior, 1998), (2) teachers'/mentors' praxis (Freire, 1970), (3) program design and administration, and (4) histories of space and place in the surrounding institution and community. The following narrative considers how these nexuses add up across moments in ways that are consequential for the co-becoming of the program and its participants.

When Maria moved to Boulder in 2014, she was entirely alone. With her whole family remaining in Mexico and in the shadow of the red clay mountains around Boulder, a place perceived by many to be overwhelmingly green (geographically) and white (racially) (Hickcox, 2007), she struggled to make her new CU dorm feel like home, to find community and a sense of belonging while learning to "live in English 24/7." She reported beginning in her second year to feel herself settling in and finding mentors in her coursework in sociology and gender and women's studies. These connections, in turn, opened a floodgate to community as her life was changed immensely by the suggestion of a trusted advisor to apply for INVST Community Studies' leadership training program. Her involvement in INVST, in turn, offered her opportunities to *be* and *become* the kind of community-supportive change agent she aspired to be.

When Maria and I met in April 2018 to discuss her writing and her involvement in INVST Community Studies, she spoke passionately about the communities she had found in INVST. She described the ways her INVST peers and mentors had supported both her personal and literate development. Since joining INVST she'd undertaken myriad literate learning experiences in support of her communities across borders including: interpreting for the Mexico Solidarity Network in Chicago, working with her cohort and Boulder

[9] A pseudonym.

County's immigrant community to expand voting rights, completing a year-long internship teaching English to immigrants, and writing her honors thesis on her participatory action research with Mexican women in Boulder—the focus of our text-based interview that day, and a subset of these consequential experiences.

Though her honors thesis was completed outside of the official curriculum of INVST, Maria saw this meaningful work as not only related to her development through INVST but also as directly supported (materially, affectively, and discursively) by her INVST community. When I asked if she'd had any support for her thesis from her INVST peers and mentors, she responded emphatically: "These humans kept me alive! and emotionally stable!" She noted some of the many ways they challenged and supported her and emphasized "…I call them like my "cohort" my "peers" but they're truly like my *humans*." In her time through and around INVST Maria hadn't just found a community; she'd actively helped to build and sustain multiple communities across borders. One prominent figure in the stories she told of her cherished social networks was Sabrina Sideris, INVST's director.

Twenty years earlier, Sabrina had also been fortuitously introduced to INVST through a trusted mentor. And, like Maria, the program has unquestionably altered her life path. Sabrina joined because she thought it would be useful preparation for the Peace Corps, which at that time was her only known route to focusing on peace, global issues, and helping others. But what she learned in INVST opened a whole world of options. Sabrina said she learned "what it means to focus our activism and our change making on the root causes of problems." She recounted:

> I learned about the difference between treating the symptoms and looking at the roots… I had an opportunity to go much much deeper into an exploration of people and places and topics and understand how they all confused me and how they all helped me make sense of the world.

Maria and Sabrina's experiences learning and becoming as students in INVST were quite consequential and enacted the core aspects of enriched environments: meaningful complexity, individual optimization, and voluntary participation. Further, as is particularly important for educational programs working with students to recognize and enact their agency as social changemakers, the structure and governance of the program invited participants to co-create the program in large and small ways.

Sabrina's route from INVST led many places, including back to INVST—first as a volunteer, then a staff member, then a teacher, and then when she was invited back to direct. At the time of our meeting, she had been directing for eleven years. Sabrina's care in tending to the continued becoming of the program is evident not just in her long history with it, but in the many ways she practices and models the values of the program—bolstering the INVST community's shared power by intentionally decentering her own title, "Director," and diffusing power by facilitating consensus-based community decision-making through INVST's Directors' Committee—its major governing body, which Sabrina told me includes all current students, staff, and instructors, and even interested alumni.

INVST's approach to shared governance through consensus was built into the program when it was founded in 1990 by a group of activist-minded, interdisciplinary faculty and students, fresh off Boulder activists' long fight to close the Rocky Flats nuclear plant. Given the ongoing becoming of the program and its shifting membership, the longevity of that shared practice certainly doesn't mean it has been practiced the same way over the program's life. The program's official history, in fact, explains how a long-time director, Dr. Lowe Steffen left the program amidst controversy with a fund-raising board after an ad hoc committee she had assembled (but which had not yet been voted on by the Directors' Committee) recommended her removal to the Dean. Despite that troubled departure, Sabrina paid homage to Dr. Lowe Steffen's impact on the program and on her personally:

> I owe a tremendous amount of gratitude to one of my predecessors...she was the INVST director for 13 and a half years. And so many many many many many many aspects of the directors' committee structure and our approach to teaching … while they weren't created by her, because INVST is 28 years old and it existed for a few years before she came along, she really did [tapping the table for emphasis on the bolded words] **perfect** them, she really did **hone** them, she really did **cement** them into being in a beautiful way and she was **my** teacher and mentor, and my boss for many years, so I owe a lot of what I know about service learning to **her**.

Sabrina's gratitude for her predecessor's contributions to her own and the program's becoming was paralleled elsewhere in our discussion by her gratitude for an alumnus, Wilder Therese, whose passion and dedication for social justice and to INVST had recently led to an important community process of shared study, collaborative revision of programmatic statements, and the launching of continuing community conversation spaces to build action on their newly defined values into the structure of the program. Sabrina made it a point in our conversation to name Wilder and to thank them for their dedication to making [the people of] INVST better—a poignant reflection of how the actions of individuals in this relatively egalitarian space ripple out to affect the whole.

In the above narrative, I center the seemingly discreet "nexuses" of activities—students' literate practice, teachers'/mentors' praxis, administrative apparatus at the programmatic and institutional levels, and local histories—as practical points of focus. However, it is critical to recognize that, while a useful frame, these nexuses are not actually discrete or separable, as, we are continuously learning across fields, nothing that *matters* really is. Barad's (2007) theory of agential realism sheds light on how objects, both material and discursive, emerge through their intra-actions: "Individuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating" (p. ix). Here, INVST emerges out of trajectories of cross-generational, multi-scale moments across people co-becoming over time. Maria as INVST student, Sabrina as INVST mentor, the governance structure of the Directors' Committee, scholar-activism in Boulder, and more emerge as part of their entangled intra-relating. Rather than studying INVST as a "bubble world" (Tsing, 2015, p. 157-58) as institutional research so often does, centering *perezhivanie* as a theoretical and methodological lens here and tracking resonances across chains of moments enables a view of INVST's polyphonic assemblages —the ways it invites gatherings of ways of being that participants find meaningful to their becoming. In so doing, it points to the ways social justice educational programs, through

the intentional building of enriched learning environments, might maintain such spaces for co-genetic becoming of social change agents through the contingencies of historical change.

Perezhivanie of aphasia and ag(e)ing in Brazil: Paulo's becoming

To exemplify *perezhivanie* as distributed across people and their historical, material, embodied environments, and the dialogic character of all experience, I (Mazuchelli) draw diffractively on data from an extensive study that investigated the entanglements of the circulation of stereotypes and representations in commercials aired through mass media with my participants' experiences of ag(e)ing and illness. From that study, I bring Paulo's account to show how it is laminated by senses of ag(e)ing and social transformations over decades.

I met Paulo in 2010 when I entered the graduate program in Linguistics and joined the activities at the Center for People with Aphasia (CCA) that Paulo had joined a year before[10]. Paulo had had an ischemic stroke in 2009, which resulted in aphasia characterized as fluent, with speech production marked by semantic and phonetic-phonological paraphasia, pauses, and hesitations when searching for words (Fugiwara, 2013; Souza-Cruz, 2017). During the activities, he always spoke with pride in how he had "iron health"[11] and used to walk 15 kilometers every day before the stroke. He always spoke frankly on various topics and was often open about his frustration dealing with his linguistic struggles. Because of our connection working together at CCA and his openness to discuss and share his opinions, I invited him to participate in my doctoral research.

My interest in interviewing Paulo also concerned him being part of a generation that witnessed the "longevity revolution" in Brazil—from 1940, when Paulo was four, to 2017, when I interviewed him, life expectancy at birth increased more than 70% (IBGE, 2018). This bio-cultural-historical transformation is associated with increased access to health care (WHO, 2002; Kalache, 2014), which is partly explained by the enactment of the Federal Constitution (FC) of 1988, a milestone in the country's re-democratization process that created legal bases for the Unified Health System (SUS) and the laws that benefited ag(e)ing individuals: pension salary irreducibility, family financial support, free public transport, and a minimum wage (Veras & Oliveira, 2018).

According to Veras and Oliveira (2018), the revolution connects to a broad civil discussion on ag(e)ing. Attempts to transform debates into public policies can be seen in the creation of the National Policy for the Elderly (NPE; Brasil, 1994), which defined 60 as the beginning of old age and determined specialized care in health and government networks, and in the Elderly Statute (ES; Brasil, 2003), which consolidated the rights provided in the FC and NPE and included frameworks to fight ageism. This process was consequential in developing a health issue prevention system that guided workers in assessing functional capacities and in identifying and preventing nutritional deficiencies,

[10] The center, part of the Neurolinguistics Laboratory, focuses on working with stroke survivors on social uses of language through games, sharing life experiences, visiting art exhibits on campus, cooking, role-playing, and discussing what is happening globally.

[11] The expression "saúde de ferro" ("healthy of iron") can be translated to English as "having an iron constitution."

social isolation, and functional and cognitive loss. It stands out that, while providing an arguably more robust assistance network and improving the debate against ageism, an unanticipated byproduct was also a strengthening of people's sense that old age is associated with patterns of dependency and loss.

These senses circulated in most of the commercials I analyzed where it was typical to characterize ag(e)ing negatively. As the panels in Figure 7 illustrate, the semiotic repetition in representation (white hair, clothes and environments highly marked by outdated fashion, accessories associated with physical limitations – the cane – always sitting or not mobile) and the positioning of ag(e)ing individuals as in constant need of support to understand what people say (because of hearing problems, for example) or to grasp technology is striking. For example, the commercial "Everyone uses the Itaú app" in the bottom right panel (Itaú, 2016d) starts with the granddaughter offering her grandfather help with the bank app. Instead of answering her, the man turns to the camera and ironically responds that "people think we don't understand technology." He emphasizes that he uses his phone app for all bank transactions and even uses it for "posting pictures with hashtags," but his pronunciation of "hashtag" is corrected by his wife.[12] The man responds to the woman's correction by explaining that he knows what it means in Portuguese – "I know, 'old woman's game,'" which she misunderstands, thinking he called her "old." She rejects it by emphatically saying that he is the old one (bottom right image in Figure 7).[13]

Figure 7: Snapshots of commercials analyzed. From left to right, Itaú (2016a), Itaú (2016b), Itaú, (2016c), BomBril, (2011a), BomBril, (2011b), Itaú, (2016d).

The commercial ends with the man returning to the camera after laughing at his wife's misunderstanding while reinforcing that "everyone is using the app." By using an older man to present the app functions, the commercial plays with a widespread narrative (a dispersed bio-cultural-historical weight) of ag(e)ing individuals having difficulty with new technology while extolling the app as user-friendly. As seen in other commercials, the app

[12] Brazilian Portuguese (BP) speakers tend to insert the phoneme /i/ at the end of English syllables that end with consonants: "shop" ['shäp], for example, can be pronounced as ['shäpi]. As /h/, aspirated English sounds can be pronounced as /R/.

[13] In BP, the hashtag symbol # is popularly known as "jogo da velha" ("old woman's game") and refers to the game known in English as "tic-tac-toe."

is so simple that *anyone* can use it. The reference to posting pictures with hashtags reinforces youth values working as a "compass" for ag(e)ing individuals' social acceptance (Hockey & James, 1993). The woman's surprise and refusal to be called "old woman" when she hears "old woman's game" is another example of the recurrent stereotypical ag(e)ing representation that actualizes and reinforces negative senses (Mazuchelli, 2019).

In the interview, Paulo articulated some of these common senses of ag(e)ing. He stressed those associated with physical difficulty when he said he could no longer walk as he had, tapping his right leg while saying, "it doesn't work!"[14] Having worked most of his life in construction, work that is still highly manual and dependent on physical strength, this limiting sense of ag(e)ing stands out in the interview. For Paulo, the challenge of dealing with the pain in his leg seems to be intensified by his frustration at having to use public transportation (with its ag(e)ing buses, unsafe seats, and limited bus stops). His physical losses point to affective, embodied, indexical and historical intensities of his becoming. Another interesting moment in our conversation is Paulo's introspection before answering my question, "what is ag(e)ing?". As seen in Figure 8, he holds his arms, looks down, and takes a deep breath while seeming to consider his answer. He then says that he didn't know; he got old "without knowing *what it is*." That resonated with me because I had always considered him an assertive person. His careful reflection followed by a stark gesture (moving his right fingers from the chin out) seems to express his frustration about his uncertainty on the subject.

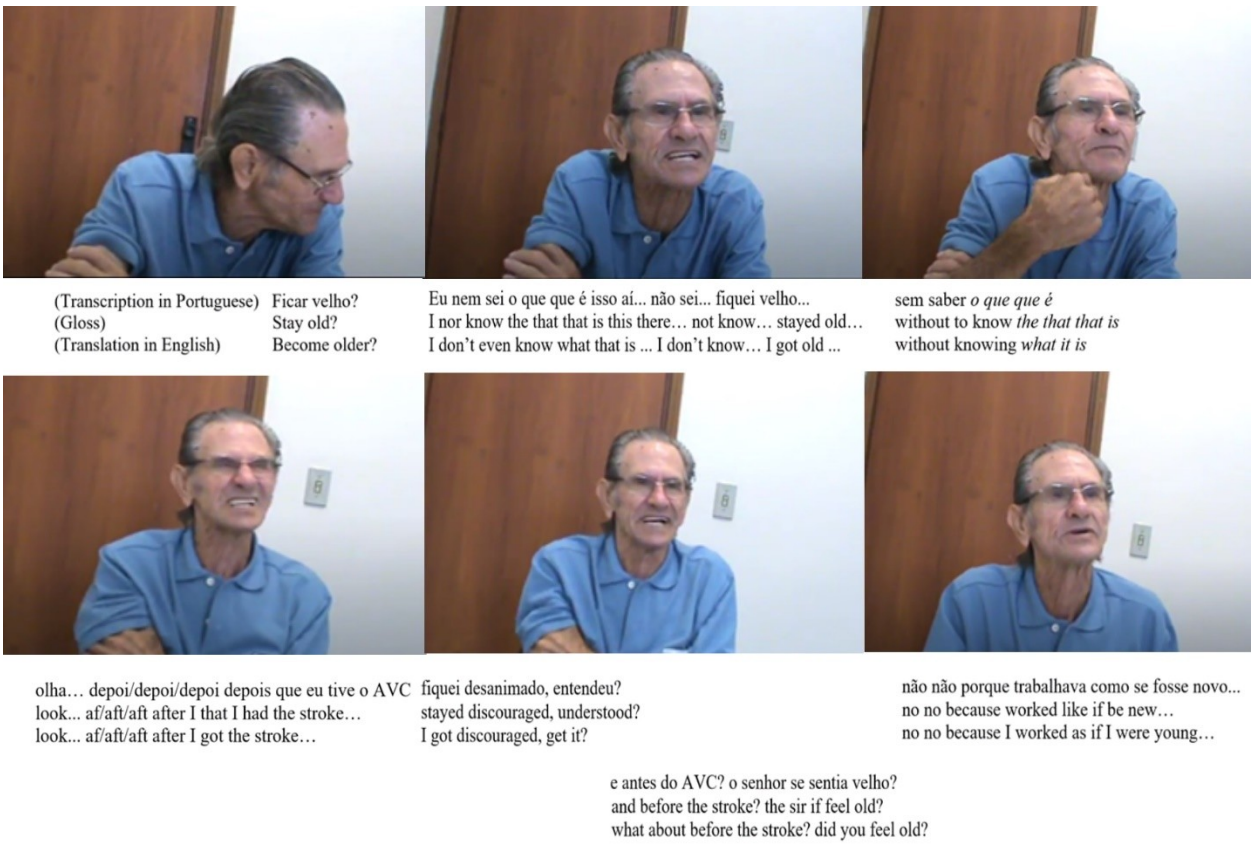


Figure 8: Paulo's account of aging.

[14] "Não funciona!" (not work).

Like the woman in the commercial and the country's public policies, this moment in Paulo's interview seems to show a process of identification with ag(e)ing marked by rejection and difficulty in recognition. But he continues explaining that it was only *after* he had the stroke that he felt discouraged. Paulo associates ag(e)ing with the dismay that accompanied that traumatic experience, even though he suffered the stroke when he was 73 years old—long after the "official" onset of ag(e)ing, a sentiment shared by other stroke survivors (Hengst, 2001). Paulo reinforces this sense later in the conversation when he explains that he did not feel old *before* the stroke, mainly because he "worked as if he was young." Returning to this interview and remembering the surprise I felt at the time by his marked response echoes the sparkle moment in our opening vignette, as the embodied intensity of our conversation is only partly conveyed in the transcript. It also makes me think about how Paulo's ag(e)ing becoming (a fusion of holobiont person and environment), the country's uncertainties with dealing with its demographics and social transformations, and our *perezhivanie* group's discussions have become aligned and entangled in my recollection/reconstruction of these heterogeneities and intensities and have become consequential in my work on ag(e)ing.

Conclusions

Motivated to explore Lemke's (2000) questions about how moments add up to lives and to social life, our group initially focused on *perezhivanie* and affective intensity, like the sparkle moment in the opening vignette, as key to understanding becoming through an ontology of moments. However, as we analyzed our research and others', we concluded that intensities are not only affective but also emerge as people manage multiple indexical fields amid complex intra-actional moments and as polyphonic histories animate those moments. We recognized that consequential moments can arise amidst quiet, routine moments, not only from drama and trauma. We also recognized that becoming is shaped not only by the intensities of moments, but also by the sustained, often backgrounded, bio-cultural-historical *weight* co-genetically embedded as affordances in emergent functional systems that generates *resonances* across beings, sociomaterial spaces, and timescales. Working against theoretical binaries that reductively construe experience as personal or social, cognitive or affective, mind or body, linguistic or nonverbal, normative or neurodiverse, and against methods that have crystalized presuppositions of quite contrary theories (e.g., interviews as genetically designed to uncover the inner thoughts of an individual), we aimed to illuminate relations among *perezhivanie*, intensities, and becoming by aligning dialogic semiotics with flat CHAT assemblage, exploring embodiment as complex biological and material intra-action, identifying rich communicative environments as a model for both becoming and praxis, and taking an ethico-onto-epistemological approach to research.

As we diffractively analyzed the four research sites presented here with their varied focal genetic scales, we came to four main conclusions. First, an ontology of moments that traces *perezhivanie* and becoming must orient to what makes moments *consequential* in ongoing trajectories of becoming. Second, consequentiality is related to indexical, intra-actional, and historical, as well as affective, intensities; to the co-genetic, bio-cultural-

historical weight of highly routinized and deeply sedimented environments; and to dialogic resonances (durable and emergent) across moments. Third, ethico-onto-epistemological research on intensity, weight, and resonance can draw on a range of systematic measures and analytic frameworks (not rely on recognition and report alone). Fourth, the model of rich communicative environments offers both a metric for assessing existing environments and a grounded template for designing more socially just and inclusive ones. The four research examples illustrate textures of *perezhivanie* as intensity, weight, and resonance intra-act in and across moments.

Kovanen's case foregrounds the microgenetic scale (Wertsch, 1985), as three students simultaneously engaged intra-actionally with one another; with the complex manipulation of films, light sources, and IO devices; with collaboratively imaging and writing up the lab in Google Docs; and with doing school (finishing on time). The students' affective intensities were indexed in mock weeping and a round of high-fives when the measurements stabilized. Bio-cultural-historical weight here may be seen, for example, in the backgrounded practices of enclosure and partition Foucault (1977) called disciplinary: that this is a physics lab in a physics building, that it is ranked as introductory, that the historical gendering of science was arguably indexed in the tendency of groups to be formed as all male or all female (as in this example). Dialogical resonances here become visible in the cooled-off, canonical, written report, which resonates across long timescales with similar practices in other scientific labs (e.g., as identified by Knorr-Cetina, 1981), and in the way this lab resembled previous labs that semester (a shorter timescale indexed in the group's already routine ways of working together).

Foregrounding the ontogenetic scale (Vygtosky, 1997; Scribner, 1985), Ware traces how a decade earlier Joiya's writing activity assumed a key directive function for processing *affective intensities* around pain and its triggers, and how she negotiated that pain by externalizing it in laminated indexical fields as her pain sitting beside her, an embodied conceptual metaphor. During dialogic animation of a blog post, she seemed to manage *dialogic resonances* of pain she once felt around times she was writing, historical intensities invoked here-and-now indexically and intra-actionally registered in her embodied activity: wincing, bracing for again-living, and bringing feelings from her past to the present. All of this occurs in the (for Joiya now) troubling context of the widely dispersed bio-cultural-historical weight of Christianity (Christian people, practices, artifacts) that confronted her pervasively in everyday settings and of mental health care as she repeatedly encountered and engaged with its representations of and treatments for bi-polarity. The blog post and its reanimation highlight dialogic resonances across trajectories of *perezhivanie*.

Foregrounding co-genetic links (Prior, 1998) of ontogenesis and mesogenesis (Cole, 1995), Turnipseed examines how institutional becoming—the nexus of trajectories that constitute INVST as a university social justice program—is entangled with the becoming of two focal participants, Sabrina (INVST's director) and Maria (a student in the program). Intra-actionally, intensities became visible during interviews in explicit lexical choices, in marked examples of repetition (like Sabrina's long string of "manys"), in indexical fields woven together in narratives, and in the fusion of biographical and institutional histories. The bio-cultural-historical weight of the university's practices (from settler colonialism to the central themes of disciplinary power—partition, rank, the pairing of direction and compliance) were counter-balanced by practices of collective decision making, the

decentering of authority, and routine boundary crossing as students engaged in community projects (often far—geographically, politically, culturally—from the university environment). Dialogic resonances were visible in the strong life-history resonances of Sabrina's and Maria's cross-generational *perezhivanie* around participation in INVST.

Foregrounding the entanglements of cultural-historical, meso-, and onto-genesis, Mazuchelli locates Paulo's *perezhivanie* after a stroke in relation to the drumbeat of negative media representations of ag(e)ing. For Paulo, it is not ag(e)ing that is foremost in his everyday *perezhivanie*, but infirmity, which, for example, emerges at intersections of his reduced embodied mobility and limited public transportation. As Vygotsky (1993) highlighted, the central effects on becoming for differently abled persons often involve social worlds designed for (and by) more typically abled others (Hengst, 2015, 2020; Hengst et al., 2016). Paulo's stroke cast him into environments that were much more restrictive than ag(e)ing itself. Affective intensities are indexed in Paulo's embodied frustration and uncertainty with what ag(e)ing meant to him, which can be analyzed in his gestures, intonation, and discourse. Bio-cultural-historical weight is seen in both the scripted determinist narratives of ag(e)ing in the analyzed commercials and in the country's complex social and political transformations around ag(e)ing that partly account for Paulo' s access to essential treatment options. Dialogical resonance can be seen in similar sentiments expressed by other stroke survivors who reported that their strokes were a turning point in their "feeling old" (Hengst, 2001; Mazuchelli, 2019).

Each of the four research sites are attempting to enrich environments for participants in ways that we argue align clearly to the three critical dimensions of enrichment (meaningful complexity, voluntariness, and optimization) that Hengst, Duff and Jones (2019) identify. All the sites aim to enhance voluntariness in how people participate (in the physics lab) or if they participate (in the other three cases). All support participants in building meaning from complex experiences, and all seek to flexibly optimize individuals' participation. The pedagogical reforms in the physics lab align well with rich communicative environments, which "invite and support multiple means of participation" and offer "opportunities for, and openness to, multiple ways of achieving goals and defining success" (Hengst et al., 2019, p. 221). The Clergy Project aims to support religious workers as they move from beliefs, practices, and often professions that had defined their lives to reconstruct their identities, a reconstruction that often, as in Joiya's case, involves trajectories of intensely dialogic talk, reading, and writing. INVST aims to build institutional environments that support health, learning, and social and environmental justice for students and communities. Here we would highlight the strong cross-generational resonances of Sabrina's and Maria's *perezhivanie* and becoming around social identities and sociopolitical activism that constitute INVST. Paulo's case entangles social policies at national scales that increased longevity with a local institution that aims to assist individuals who have experienced strokes by tailoring interventions that work against restrictive, normative environments as the individuals work with others and varied tools/practices to re-mediate their lives. Critically, the four research projects were designed to contribute to the work of these sites (and related ones) and to further enrich environments.

The emphasis on voluntariness (agency) and individual optimization in the bio-ecological model of rich communicative environments calls for radically reworking the everyday politics of many practices. As Foucault (1977) documented, that politics has been

dominated by a modern microphysics of power that has aimed to enhance performance through standardization and pedagogies of control, compliance, and procedural display (e.g., Bloome et al., 1989; McNeil, 1986; Minick, 1993). Barad's (2007) notions of intra-active becoming and entanglement argue for a new microphysics of power that aligns with entangled becoming in dynamic worlds, that aims to enhance life through embracing diversity as in Tsing's (2015) polyphonic assemblages, and that seeks transformative pedagogies for becoming-with (e.g., Haraway, 2016; Stetsenko, 2017; Holzman, 2016). Hengst, Duff, and Jones's (2019) framework, we argue, offers a powerful set of principles for assessing and (re)designing environments to seek consequential moments of *perezhivanie* that arc toward social justice.

References

Agha, A. (2007). *Language and social relations*. Cambridge University Press

Alwis, D. S., & Rajan, R. (2014). Environmental enrichment and the sensory brain: The role of enrichment in remediating brain injury. *Frontiers in Systems Neuroscience, 8*, Article 156. https://doi.org/10.3389/fnsys.2014.00156

Ansell, K. (2020). *Cultivating adaptive expertise in the introductory physics laboratory* [Dissertation, University of Illinois Urbana-Champaign]. http://hdl.handle.net/2142/107872

Bakhtin, M. (1981). *The dialogic imagination: Four Essays*. (C. Emerson & M. Holquist, Trans.; M. Holquist, Ed.). University of Texas Press.

Bakhtin, M. (1986). *Speech genres and other late essays*. (C. Emerson & M. Holquist, Eds.). University of Texas Press.

Bang, M. & Vossoughi, S. (2016). Participatory design research and educational justice: Studying learning and relations within social change making, *Cognition and Instruction, 34:3,* 173-193.

Barad, K. (2017). What flashes up: Theological-political-scientific fragments. In C. Keller & M.J. Rubenstein (Eds.), *Entangled worlds: Religion, science, and new materialisms* (pp. 21-88). Fordham University Press.

Barad, K. (2010). Quantum entanglements and hauntilogical relations of inheritance: Dis/continuities, spacetime enfoldings, and justice-to-come. *Derrida Today, 3(2)*, 240-268.

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning.* Duke University Press.

Becvar Weddle, A., & Hollan, J. D. (2010). Professional perception and expert action: Scaffolding embodied practices in professional education. *Mind, Culture, and Activity*, *17(2)*, 118-148.

Bloome, D, Puro, P., & Theodorou, E. (1989). Procedural display and classroom lessons. *Curriculum Inquiry, 19*, 265-291.

Blunden, A. (2016). Translating *perezhivanie* into English. *Mind, Culture, and Activity*, *23(4*), 274-283.

BomBril (2011a, October 25). *Comercial BOMBRIL - Para senhoras de idade avançada*. [Video]. YouTube. https://www.youtube.com/watch?v=bEjR_zn04P4

BomBril (2011b, October 25). *Comercial BOMBRIL – Família Bombril: o avô*. [Video]. YouTube. https://www.youtube.com/watch?v=v-6TOELc6_Q Access: Aug 2, 2021.

Bordenstein, S., & Theis, K. (2015). Host biology in light of the microbiome: Ten principles of holobionts and hologenomes. *PLOS Biology*, *13*, e1002226. https://doi.org/10.1371/journal.pbio.1002226

Brasil (1994). *Política Nacional do Idoso* [National Policy for the Elderly]. Law nº 8.842, January 4th, 1994. Brasília, DF.

Brasil (2003). *Estatuto do Idoso* [Elderly Statute]. Law nº 10.741, October 1st, 2003. Brasília, DF.

Churchill, J. D., Galvez, R., Colcombe, S., Swain, R. A., Kramer, A. F., & Greenough, W. T. (2002). Exercise, experience, and the aging brain. *Neurobiology of Aging, 23(5*), 941–955.

Cole, M. (1995). Socio-cultural-historical psychology: Some general remarks and a proposal for a new kind of cultural-genetic methodology. In J. Wertsch, P. del Rio, & A. Alvarez (Eds.), *Sociocultural studies of mind* (pp.187-214). Cambridge University Press.

Cole, M. (1996). *Cultural psychology: A once and future discipline*. Harvard University Press.

Coupland, N. (2008). The delicate constitution of identity in face-to-face accommodation: A response to Trudgill. *Language in Society*, *37*, 267-270.

Csikszentmihalyi, M. (2014). *Flow and the foundations of positive psychology: The collected works of Mihalyi Csikszentmihalyi* (Vol. 2). Springer.

del Rio, P., & Alvarez, A. (2007) Inside and outside the zone of proximal development. An ecofunctional reading of Vygotsky. In J. H. Daniels, M Cole, & J. V. Wertsch (Eds.) *The Cambridge Companion to Vygotsky* (pp. 215-247). Cambridge University Press.

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia*. (B. Massumi, Trans.). University of Minnesota Press.

Engeström, Y. (1987). *Learning by expanding: An activity-theoretic approach to developmental research*. Orienta-Konsultit.

Engeström, Y. (2006). Development, movement, and agency: Breaking away into mycorrhizae activities. In K. Yamazumi (Ed.). *Building activity theory in practice: Toward the next generation* (pp. 1–43). Center for Human Activity Theory, Kansai University.

Engeström, Y, & Sanino, A. (2010). Studies of expansive learning: Foundations, findings, and future challenges. *Educational Research Review*, *5*, 1-24.

Erstad, O., Gilje, Ø., Sefton-Green, J., & Arnseth, H.C. (2016). *Learning identities, education and community: Young lives in the cosmopolitan city*. Cambridge University Press.

Ferholt, B., & Nilsson, M. (2016). *Perezhivaniya* as a means of creating the aesthetic form of consciousness. *Mind, Culture, and Activity*, *23*, 294-304.

Fleer, M., González Rey, F., & Veresov, N. (2017). *Perezhivanie, emotions, and subjectivity: Advancing Vygotsky's legacy.* Springer.

Foucault, M. (1977). *Discipline and punish: The birth of prison*. (A. Sheridan, Trans.). Pantheon.

Freire, P. (1970). *Pedagogy of the oppressed*. (M. Ramos, Trans.). Seabury.

Fugiwara, R. V. E. (2013). *Processos de (inter)compreensão nas afasias: um estudo neurolinguístico na perspectiva bakhtiniana*. Tese (doutorado). Instituto de Estudos da Linguagem. Universidade Estadual de Campinas.

Gallagher, J. R., Turnipseed, N., Yoritomo, J. Y., Elliott, C. M., Cooper, S. L., Popovics, J. S., Prior, P., & Zilles, J. L. (2020). A collaborative longitudinal design for supporting writing pedagogies of STEM faculty. *Technical Communication Quarterly*, *29*(4), 411–426.

Gilbert, S.F. (2019). Evolutionary transitions revisited: Holobiont evo-devo. *Journal of Experimental Zoology B: Molecular and Developmental Evolution, 332 (8),* 307-314.

Goffman, E. (1981). *Forms of talk*. University of Pennsylvania Press.

Goffman, E. (1974). *Frame analysis: An essay on the organization of experience.* New York: Harper & Row

González Rey, F. (1999). Personality, subject and human development: The subjective character of human activity. In S. Chaiklin, M. Hedegaard, & J. Uffe. (Eds.), *Activity theory and social practice: Cultural-historical approaches* (pp. 253-275). Aarhus University Press.

González Rey, F. L. (2009). Historical relevance of Vygotsky's work: Its significance for a new approach to the problem of subjectivity in psychology. *Outlines. Critical Practice Studies*, *11*(1), 59–73. https://doi.org/10.7146/ocps.v11i1.2589

González Rey, F. (2011). The path to subjectivity: Advancing alternative understandings of Vygotsky and cultural historical legacy. In P. Portes & S. Salas (Eds.), *Vygotsky in 21st century society: Advances in cultural historical theory and praxis with non-dominant communities* (pp. 32-49). Peter Lang.

González Rey, F. (2017). Advances in subjectivity from a cultural-historical perspective: Unfoldings and consequences for cultural studies today. In M. Fleer, F. González Rey, & N. Veresov (Eds.), *Perezhivanie, emotions, and subjectivity: Advancing Vygotsky's legacy* (pp. 173-193). Springer Nature.

González Rey, F. (2019). Subjectivity as a new theoretical, epistemological and methodological pathway within cultural-historical psychology. In F. Gonzalez Rey, A.

Martinez, & D. Goulart (Eds.), *Subjectivity within cultural-historical approach: Theory, methodology, and research* (pp. 21-36). Springer Nature.

Guiterrez, K. (2018). Social design-based experiments: A proleptic approach to literacy. *Literacy Research: Theory, Method, and Practice*, *67*, 86-108.

Hanks, W. (1990). *Referential practice: Language and lived space among the Maya*. University of Chicago Press.

Hanks, W. (1996). Exorcism and the description of participant roles. In M. Silverstein, & G. Urban (Eds.) *Natural Histories of Discourse* (pp. 160-202). University of Chicago Press.

Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene.* Duke University Press.

Hasson, Uri, Giovanna Egidi, Marco Marelli, and Roel M. Willems. (2018). Grounding the neurobiology of language in first principles: The necessity of non-language-centric explanations for language comprehension. *Cognition, 180*, 135-157.

Hebb, D.O. (1949). *The organization of behavior: A neuropsychological theory*. Wiley.

Hengst, J.A. (2001). *Collaborating on reference: A study of discourse and aphasia*. Unpublished doctoral dissertation, University of Illinois, Urbana.

Hengst, J.A. (2015). Distributed communication: Implications of cultural-historical activity theory (CHAT) for communication disorders. *Journal of Communication Disorders, 57,* 16-28.

Hengst, J.A. (2020). *Understanding everyday communicative interactions: Introduction to situated discourse analysis for Communication Sciences and Disorders*. New York: Routledge.

Hengst, J.A., Duff, M.C., & Jones, T. (2019). Enriching communicative environments: Leveraging advances in neuroplasticity for improving outcomes in neurogenic communication disorders. *American Journal of Speech-Language Pathology, 28*, 216-229.

Hengst, J.A., McCartin, M., Valentino, H, Devanga, S., & Sherrill, M. (2016). Mapping communicative activity: A CHAT approach to design of pseudo-intelligent mediators for Alternative and Augmentative Communication. *Outlines. Critical Practice Studies, 17(1), 5-38*.

Hengst, J.A., & Miller, P.J. (1999). The heterogeneity of discourse genres: Implications for development. *World Englishes, 18,* 325-341.

Hickcox, A. (2007). Green belt, white city: Race and the natural landscape in Boulder, Colorado. *Discourse*, *29*(2), 236-259.

Hockey, J., & James, A. (1993). *Infantilization as social discourse. Growing up and growing old: Age and dependency in the life course*. Sage.

Hollett, T., & Hein, R. (2019). Affective atmospheres and skatepark sessions: The spatiotemporal contours of interest. *Learning, Culture and Social Interaction*, *23*, Article: 100265. https://doi.org/10.1016/j.lcsi.2018.12.001

Holzman, L. (2017). *Vygotsky at work and play* (2nd ed). Routledge.

Hutchins, E. (1995). *Cognition in the wild*. MIT Press.

IBGE, (2018) Projeções da População do Brasil e Unidades da Federação por sexo e idade: 2010-2060, Rio de Janeiro. https://www.ibge.gov.br/estatisticas/sociais/populacao/9109-projecao-da-populacao.html?=&t=resultados. Access: Nov 21, 2021.

Itaú (2016a, April 6). *Digitau: nosso app é facinho de usar como o Facebook.* [Video]. YouTube. https://www.youtube.com/watch?v=kimGRgCRN6w.

Itaú (2016b, April 6). *Digitau: app funciona na maioria do smartphones, inclusive no seu!* [Video]. YouTube. https://www.youtube.com/watch?v=BCGEagX86f8.

Itaú (2016c, April 6). *Digitau: dicas no app já no primeiro acesso pra quem não manja de tecnologia.* [Video]. YouTube. https://www.youtube.com/watch?v=sR6CfTAODrA.

Itaú (2016d, April 11). *Baixe o app Itaú no celular.* [Video]. YouTube. https://www.youtube.com/watch?v=hdthBSDwojo.

Jóhannsdóttir, T., & Roth, W. M. (2014). Experiencing (*Pereživanie*) as developmental category: Learning from a fisherman who is becoming (as) a teacher-in-a-village-school. *Outlines. Critical Practice Studies*, *15(3)*, 54-78.

Jornet, A., & Roth, W. M. (2016). *Perezhivanie*—A monist concept for a monist theory. *Mind, Culture, and Activity*, *23*, 353-355

Kalache, A. (2014). Respondendo à revolução da longevidade. *Ciência & Saúde Coletiva*, 19, 3306.

Kendon, A. (1990). *Conducting interaction: Patterns of behavior in focused encounters.* Cambridge University Press.

King, M. L., Jr. (1965). Commencement Address. Oberlin College. https://www2.oberlin.edu/external/EOG/BlackHistoryMonth/MLK/CommAddress.html

Knorr-Cetina, K. (1981). *The manufacture of knowledge: An essay on the constructivist and contextual nature of science*. Pergamon Press.

Ko, M. M., & Krist, C. (2019). Opening up curricula to redistribute epistemic agency: A framework for supporting science teaching. *Science Education*, *103*(4), 979–1010.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. Oxford University Press.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Latour, B., & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts*. Princeton University Press.

Leander, K., & Boldt, G. (2013). Rereading "A pedagogy of multiliteracies" bodies, texts, and emergence. *Journal of Literacy Research*, *45*(1), 22-46.

Leander, K. M., & Ehret, C. (Eds.). (2019). *Affect in literacy learning and teaching: Pedagogies, politics and coming to know*. Routledge.

Lemke, J. (2000). Across the scales of time: Artifacts, activities, and meanings in ecosocial systems. *Mind, Culture, and Activity, 7*, 273–290

Linell, P. (2009). *Rethinking language, mind, and world dialogically: Interactional and contextual theories of human sense-making*. Information Age Publishing.

Leont'ev, A.N. (1978). *Activity, consciousness, and personality*. Prentice-Hall.

Mainardes, J. (2022). Contributions from the ethico-onto-epistemological perspective for research in the field of education policy. *Education Policy Analysis Archives, 30* (146) https://doi.org/10.14507/epaa.30.7436

Maran, T. and Kull, K. (2014). Ecosemiotics: Main principles and current developments, *Geografiska Annaler: Series B, Human Geography*, *96*, 41–50.

Margulis, L. (1991). Symbiogenesis and symbionticism. In L. Margulis & R. Fester (Eds.), *Symbiosis as a source of evolutionary innovation: Speciation and morphogenesis* (pp. 1-15). MIT Press.

Massumi, B. (2002). *Parables for the virtual*. Duke University Press.

Mazuchelli, L. P. (2019). *Stereotypes and representations: Discourses on and in ag(e)ing*. Published doctoral dissertation. State University of Campinas, Campinas.

McNeil, L.M. (1986). *Contradictions of control: School structure and school knowledge*. Routledge & Kegan Paul.

Miller, P.J., Hengst, J.A., Alexander, K., & Sperry, L.L. (2000). Versions of personal story telling, versions of experience: Genres as tools for creating alternate realities. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: The development of magical, scientific, and religious thinking in contemporary society* (pp. 212-246). Cambridge University Press.

Miller, P.J., Hengst, J.A., & Wang, S. (2003). Ethnographic methods: Applications from developmental cultural psychology. In P.M. Camic, J.E. Rhodes, & L. Yardley (Eds.), *Qualitative research in psychology: Expanding perspectives in methodology and design* (pp. 219-242). American Psychological Association

Minick, N. (1993). Teacher's directives. In S. Chaiklin, & J. Lave (eds.), *Understanding practice: Perspectives on activity and context* (pp. 343-374). Cambridge University Press.

Mol, A. (2002). *The body multiple: Ontology in medical practice.* Duke University Press.

Muotri, A., & Gage, F. (2006). Generation of neuronal variability and complexity. *Nature, 441,* 1087-1093.

New London Group. (1996). A pedagogy of multi-literacies: Designing social futures. *Harvard Educational Review. 66*, 60-92.

Paquola, A., Erwin, J., & Gage, F. (2017). Insights into the role of somatic mosaicism in the brain. *Current Opinion in Systems Biology*, *1*, 90-94.

Peirce, C. (1998). *The essential Pierce: Selected philosophical writings, volume 2 (1893-1913)*. Indiana University Press.

Perrin, D. (2012). Transdisciplinary action research: Bringing together communication and media researchers and practitioners. *Journal of Applied Media and Journalism Studies*, *1*, 3-23.

Prior, N. (2020). What's in a moment? What can be learned about pair bonding from studying moment-to-moment behavioral synchrony between partners. *Frontiers in Psychology*, 11:1370. doi: 10.3389/fpsyg.2020.01370

Prior, P. (2018). How do moments add up to lives? Trajectories of semiotic becoming vs. tales of school learning in four modes. In R. Wysocki and M. Sheridan (Eds.), *Making future matters*. Utah State Press/Computers and Composition Digital Press. http://ccdigitalpress.org/book/makingfuturematters/

Prior, P. (1998). *Writing/disciplinarity: A sociohistoric account of literate activity in the academy*. Lawrence Erlbaum Associates.

Prior, P., & Hengst, J. A. (2010). Introduction: Exploring semiotic remediation. In P. Prior & J. A. Hengst (Eds.), *Exploring semiotic remediation as discourse practice* (pp. 1-23). Palgrave MacMillan.

Prior, P., & Olinger, A. (2019.) Academic literacies as laminated assemblage and embodied semiotic becoming. In D. Bloome, M. Lucia Castanheira, C. Leung, & J. Rowsell (Eds.), *Retheorizing literacy practices: Complex social and cultural contexts* (pp. 126-139). Routledge.

Prior, P., & Schaffner, S. (2011). Bird identification as a family of activities: Motives, mediating artifacts, and laminated assemblages. *Ethos: Journal of the Society for Psychological Anthropology*, *39*, 51–70.

Prior, P., & Shipka, J. (2003). Chronotopic lamination: Tracing the contours of literate activity. In C. Bazerman & D. Russell (Eds.), *Writing selves, writing societies: Research from activity perspectives* (pp. 180-238). The WAC Clearinghouse & Mind, Culture, and Activity. http://wac.colostate.edu/books/selves_societies/

Radabaugh, H. L., LaPorte, M. J., Greene, A. M., Bondi, C. O., Lajud, N., & Kline, A. E. (2017). Refining environmental enrichment to advance rehabilitation based research after experimental traumatic brain injury. *Experimental Neurology, 294*, 12–18.

Rommetveit, R. (1985). Language acquisition as increasing linguistic structuring of experience and symbolic behavior control. In J. Wertsch (Ed.), *Culture, communication, and cognition Vygotskyan perspectives* (pp. 183-204). Cambridge University Press.

Roozen, K. (2020). Coming to act with tables: Tracing the laminated trajectories of an engineer-in-the-making. *Learning, Culture and Social Interaction, 24,* March, Article 1000284

Roozen, K., & Erickson, J. (2017). *Expanding literate landscapes: Persons, practices, and sociohistoric perspectives of disciplinary development*. Computers and Composition Digital Press/Utah State University Press. http://ccdigitalpress.org/expanding

Roth, W-M., & Jornet, A. (2016). *Perezhivanie* in the light of the later Vygtosky's Spinozist turn. *Mind, Culture, and Activity*, *23*, 315-324.

Salthe, S. (1993). *Development and evolution: Complexity and change in biology*. MIT Press.

Scollon, R. (2001). *Mediated discourse: The nexus of practice*. Routledge.

Scribner, S. (1985). Vygotsky's uses of history. In J. Wertsch (Ed.), *Culture, communication, and cognition: Vygtoskyian perspectives* (pp. 119-145). Cambridge University Press.

Shapiro, J. (2019). No genome is an island: Toward a 21st century agenda for evolution. *Annals of the New York Academy of Sciences, 1447*, 21-52.

Sheldrake, M. (2021). *Entangled life.* Random House.

Smith, A., & Prior, P. A. (2020). A Flat CHAT perspective on transliteracies development. *Learning, Culture, and Social Interaction*, Article 100246 https://doi.org/10.1016/j.lcsi.2018.07.002

Solomon, P., Kubzansky, P. E., Leiderman, P. H., Mendelson, J. H., Trumbull, R., & Wexler, D. (1961). *Sensory deprivation*. Harvard University Press.

Souza-Cruz, T. C. (2017). *"Entrando pelo youtubo" - estudo discursivo da organização semântico-lexical: em foco a categorização.* Tese (doutorado) - Universidade Estadual de Campinas, Instituto de Estudos da Linguagem, Campinas, SP.

Stetsenko, A. (2020). Research and activist projects of resistance: The ethical-political foundations for a transformative ethico-onto-epistemology. *Learning, Culture and Social Interaction,* Article 100222 https://doi.org/10.1016/j.lcsi.2018.04.002

Stetsenko, A. (2017). *The transformative mind: Expanding Vygotsky's approach to development and education*. Cambridge University Press.

Stewart, J., Gapenne, O., & DiPaolo, E. (Eds.). (2010). *Enaction: Toward a new paradigm for cognitive science.* MIT Press.

Stornaiuolo, A., Smith, A., & Phillips, N. C. (2017). Developing a transliteracies framework for a connected world. *Journal of Literacy Research*, *49*(1), 68-91.

Stukenbrock, A. (2012). Imagined spaces as a resource in interaction. *Bulletin VALS-ASLA*, *96*, 141-16

Tannen, D. (2007). *Talking voices: Repetition, dialogue, and imagery in conversational discourse* (2nd ed.). Cambridge University Press.

Tsing, A. (2015). *Mushroom at the end of the world: On the possibility of life in capitaliist ruins*. Princeton University Press.

van Praag, H., Kempermann, G., & Gage, F. H. (2000). Neural consequences of environmental enrichment. *Nature Reviews Neuroscience, 1(3)*, 191–198.

Varela, F. J., Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. MIT Press.

Veras, R. P., & Oliveira, M. (2018). Envelhecer no Brasil: a construção de um modelo de cuidado. *Ciência e Saúde Coletiva*, 23(6), 1929-1936.

Veresov, N. (2017). The concept of perezhivanie in cultural-historical theory: Content and contexts. In M. Fleer, F. González Rey, & N. Veresov (Eds.), *Perezhivanie, emotions, and subjectivity: Advancing Vygotsky's legacy* (pp. 47-70). Springer Nature.

Vianna, E., & Stetsenko, A. (2014). Research with a transformative activist agenda: Creating the future through education for social change. *Teachers College Record, 113(2)*, 575-602.

Voloshinov, V. (1986). *Marxism and the philosophy of language*. (L. Matejka & I. Titunik, Trans.). Harvard University Press.

Von Uexküll, J. (1982). The theory of meaning. *Semiotica, 42*, 25-82.

Vygotsky, L. (1987). *Problems of general psychology: The collected works of L. S. Vygotsky: Volume 1*. (R, Rieber & A. Carton, eds.; N. Minick, Trans.) Plenum.

Vygotsky, L. (1993). *The fundamentals of defectology: The collected works of L. S. Vygotsky: Volume 2*. (R, Rieber & A. Carton, eds.; J. Knox & C. Stevens, Trans.). Plenum.

Vygotsky, L. (1997). *The history of the development of higher mental functions: The collected works of L. S. Vygotsky: Volume 4*. (J. Glick & R, Rieber, Eds.; M. Hall, Trans.). Plenum.

Vygotsky, L. (1994). The problem of the environment. In R. Van der Veer & J. Valsiner (Eds.), *The Vygotsky Reader* (pp. 338-354). Blackwell.

Ware, R. (2022). "God's absence during trauma took its toll": Dialogic tracing of literate activity and lifespan trajectories of semiotic (un)becoming. *Written Communication*, 39:1, 129-165.

Ware, R., Turnipseed, N., Gallagher, J. R., Elliott, C. M., Popovics, J. S., Prior, P., & Zilles, J. L. (2019). *Writing across engineering: A collaborative approach to support STEM faculty's integration of writing instruction in their classes*. 2019 ASEE Annual Conference & Exposition Proceedings. https://peer.asee.org/33671

Wertsch, J. (1985). *Vygotsky and the social formation of the mind*. Harvard University Press.

Wertsch, J. (1991). *Voices of the mind: A sociocultural approach to mediated action*. Harvard University Press.

World Health Organization (WHO). (2002). *Active ageing: A policy framework*. World Health Organization.

Yoritomo, J. Y., Turnipseed, N., Cooper, S., Elliott, C., Gallagher, J. R., Popovics, J. S., Prior, P., & Zilles, J. L. (2018). Examining engineering writing instruction at a large research university through the lens of writing studies. 2018 ASEE Annual Conference & Exposition Proceedings. https://doi.org/10.18260/1-2--30467

Zittoun, T., Valsiner, J., Gonçalves, M. M., Vedeler, D., Salgado, J., & Ferring, D. (2013). *Human development in the life course: Melodies of living*. Cambridge University Press.

Acknowledgements

Mazuchelli's work was supported by The São Paulo Research Foundation [2015/15515-1] and the Fulbright Doctoral Dissertation Research Award 2018-2019.

The material on the physics class is based upon work supported by the National Science Foundation under Grant No. 2013443. This work was also supported by the Strategic Instructional Innovations Program of the Grainger College of Engineering at the University of Illinois Urbana-Champaign.

About the authors

Paul Prior is Professor Emeritus in English and the Center for Writing Studies at the University of Illinois Urbana-Champaign in the US. His research and theory have focused on literate activity, disciplinarity, lifespan becoming, dialogic semiotics, and cultural-historical activity.

Julie Hengst is Associate Professor Emerita in Speech and Hearing Sciences at the University of Illinois Urbana-Champaign. Her research draws on sociocultural and semiotic theories, ethnographic methods, and situated discourse analysis to detail everyday communicative interactions and trajectories of change among individuals managing communication differences/disorders.

Bruce Kovanen is a Postdoctoral Research Associate at the University of Illinois Urbana-Champaign, where he completed his PhD in Writing Studies. His research focuses on literate activity, cultural-historical activity theory, and labor studies.

Larissa Mazuchelli is an Assistant Professor of English and Linguistics at the Institute of Letters and Linguistics at the Federal University of Uberlandia in Brazil. Her research has focused on cultural-historical approaches in neurolinguistics, language education, and aging.

Niki Turnipseed is a Teaching Assistant Professor in the Writing Program at the University of Denver. Her research centers holistic literate development across disciplines, spaces, and lifeworlds.

Ryan Ware is Assistant Professor of Writing Studies at Landmark College. He earned his PhD at University of Illinois Urbana-Champaign's Center for Writing Studies. His research explores literate activity, dialogic semiotics, dialogic methods for research, and neurodiversity.