Perspective switching as event affordance: The ontogeny of abductive reasoning

Abstract: The present model identifies Index as the representational component driving children’s advances in abductive reasoning, capitalizing upon the means to subjunctivize within constructed events. As such, an essential semiotic device underlies the recognition of shifting perspectives to operationalize abductive reasoning within event profiles. Beyond using Index to establish the point of orientation (Origo), one “tries on” that Origo’s covert and overt orientation via deictic terms that encode Origo’s role as a conversational on-looker of an episode. This subjunctive competence entails taking note of cause-effect relations to anticipate the affective, social, cognitive, and physical viewpoints likely to be assumed by that Origo. Hypothesis-making then entails going beyond grounded experience to represent intermediate and final states of affairs for other Origos. Abductions require dynamically imaging how distinctive agents affect action schemes together with their relied-upon judgments to effectuate resultative states. The use of indexically grounded cognitions (given their role in preempting event relations) rivets the onlooker to the “why” of unexpected events and increases the likelihood that the guess of another within novel contexts is plausible. Shifting perspectives underlie abductions because they trigger defeasible but plausible explanations for puzzling events.

Keywords: abduction, deictics, Peirce, index, perspective-taking

DOI 10.1515/cogsem-2014-0011

1 Introduction

This approach asserts that graduated uses of Index in the form of deictic competencies underlie abductive advances. The specific assumption is that the type of inferencing that undergirds abduction is grounded in the expectation of particular spatial and temporal affordances (shaped by shifting event structures) universally relied upon; Index frames such dynamic structures. While other
theories hint at this relationship (Magnani 2009; Woods 2013), this account demonstrates how particular types of Index (gesture and language) give rise to subjunctive skills (others’ feelings, thoughts, orientations about an event) necessary to assume diverse perspectives in abductive reasoning. The ontogeny of such Indexes aptly traces changing spatial and temporal templates and codifies them into a system highlighting diverse event profiles. As such, Index supports graphical interplay between networks – systems handling personal experience in the form of perspective shifting, and those managing invariant principles within the physical and scientific worlds. The components of Peirce’s concept of abduction are considered in light of Gibson’s theory of affordances – perceptual principles whose universal invariance is unquestionable.

Affordances built upon indexical scaffolds (unconscious knowledge of invariant directional object/event features) construct the framework for children’s novel, truth-seeking propositions at all levels of inquiry – from discovering invariant object functions in the physical world to codifying shifting on-looker roles to scientific postulates of inter-event relations. In short, Perspective-taking competencies, which highlight within and across-event features, namely, deictic gesture and pronouns, serve as the raw material for developing abductive reasoning – to propose a course of recommended behavior within projected/prospective scenarios. Accordingly, viewpoint shifts within event templates afford children the means to exploit event affordances, via Personal and demonstrative pronouns and attentional gestures that codify directional templates: of actors, receiverships, transfers, experiencers, and the like, accentuating event affordances. Ultimately, mental Indexes in the form of memories inform children about the direction of energy within and across events, encoding trajectories of participants and objects. In short, the function of deictic Indexes (gesture, pronouns, memories) to hasten the type of inferential reasoning that qualifies as abductive logic is unmistakable.

2 Spatial and temporal primitives in the abductive turn

This inquiry presents a new perspective regarding the kinds of skills that underpin explanatory hypothesis-making. The primary claim is that, in view of the intricacies of spatial inferencing over a developmental interval of more than ten years, recognition of latent spatial shifts inherent to perspective-taking provides the most accurate measure of how abductive reasoning unfolds. The purpose is to enrich purely philosophical approaches (founded upon logic alone) with
empirical findings – supplying them with slices of embodied actuality. The present approach posits that truly abductive skills require knowledge of certain spatial and temporal invariants as well as codification of distance/orientation from on-looker roles, both of which underlie dynamic perspective-taking competencies. It initially asserts that to construct a viable account of how and why abductive reasoning emerges, spatial and temporal relatedness must be integrated into a workable, objective, and dynamic system (cf. Nozick 2001: 77–82 for a more in-depth discussion). This approach posits that the recognition of spatial coordinates predominates over the recognition of temporal ones for construction of viable orientations to places, objects, and action upon Objects within event structures. Nonetheless, apprehension of the influence of spatial and temporal coordinates on one another should not be overlooked, since it is recognition of just these proximate causes to surprising consequences that facilitates abductive rationality. In other words, settling upon viable and workable hypotheses depends substantially upon a growing awareness of disparate/unsuspecting effects that spatial and temporal coordinates impose upon one another, upon participants and their orientations, and even upon the disposition of particular events/event participants. As such, conscious notice of participants, their locations and roles in event structures, together with the affordances extracted from these events must be accorded primary status in the abductive process. Considerations foundational to assuming these diverse viewpoints necessarily entail awareness of how temporal and spatial coordinates inform one another in a relational system to generate plausible and testable hypotheses, which rest upon a system of objective (yet not conventional) standards.

Recognizing the perceptual effects and affordances of motion and force on spatial coordinates is crucial to determining common and disparate ways in which these forces impinge upon event participants. If the event participant is an animal as opposed to an infant or as opposed to an adult human, perception of affordances is distinctive, illustrating the relevance of “nesting affordances” (Magnani 2009: 354–355). This type of affordance is particularly salient when organisms with different experiences, e.g., knowledge of the effects of force upon motion – this illustrates (especially early on in development) how spatial and temporal coordinates are integrally bound, such that consideration of either principle alone would be virtually impossible (Mandler 2010: 36–37). Since motion ambulates over natural landscapes of space and through partitioned spaces, it demonstrates the elasticity or slippage afforded when the two genres are naturally integrated. In fact, absent observation of motion through space, parameters of containment would represent rather permanent barriers to expanding possibilities, precluding the emergence of novel “here-spaces,” novel inferences, and ultimately preventing cognitive niches (Magnani 2009: 346).
For the adult abducer who daily constructs cognitive niches in response to diverse event interactions, containment transcends permanent and/or idiosyncratically constructed parameters and even social ones. Accordingly, Magnani (2009) claims that nesting materializes consequent to particular “instinctive gifts” or surfaces as dynamic processes for “modifying perception” (346). This is evidenced by distinctive mechanisms of preservation, e.g., between humans and deer in attempting to make themselves invisible to avoid pursuit as prey. Ultimately, organisms mentally construct additional affordances – by means of artifact use, they bring into existence novel “cognitive niches,” which likewise serve a survival function (Magnani 2009: 346). These latter niches depend upon the proclivities of the organism's particular perceptual system and reasoning capacities. In application to humans directly, Magnani (2009: 357) claims that niches and affordances are created consequent to alterations which they consciously or unconsciously visit upon their physical and social milieus: “people manipulate the world in such a way that new cognitive chances are uncovered.”

The existence of particular kinds of motion (produced by a natural/artificial agent or self-generated propulsion) illustrates simple yet diverse ways in which space can be traversed, thus manipulating the world to create “new chances” – opening or closing containers and participant opportunities. As such, the abducer's knowledge regarding types of force and means of locomotion of an object define its mobilizing potential in space – establishing novel paths and destinations. It is obvious, then, that the abducer’s apprehension of how motion contributes to geographic constructs provides the transformational impetus to create new chances and new affordances. These novel chances likewise can serve as the impetus to determine objective effects on spatial parameters, which, in turn, supply the raw material to construct novel event structures and to posit additional innovative hypotheses to explain which factors contribute most to the end-state of novel trajectories. Without recognition of motion’s effects on localized objects via manipulation, beginning at 0;3 (Baillargeon 2004), units of events are unlikely to be perceived as dynamic by infants nested in relatively undifferentiated and formulaic event templates; as such, given their less developed experiential store, they would be stripped of the potential to evoke an explanatory account of a surprising event (or as Thagard [2007] terms it, a “puzzling event”) – a primary component of Peircean abduction. Infants do not abduce because, as Magnani (2009: 356) aptly points out, they cannot adequately modify “externalities” and do not “exploit latent chances.” The means to systematically alter one variable while keeping constant all others (spatial, temporal) permits an adult observer to manipulate the “material at play” and to discover new affordances. In this way, they generate new heights of objective hypotheses. The means that to objectify at this level forms the basis...
upon which invariance, vital for constructing and selecting viable explanations intrinsic to novel hypotheses, can be recognized.

The spatial coordinates whose recognition is critical to deconstruct and reconstruct nested abductions include: landmark associations particular to objects; relative location of objects within a container-like geographic; objects’ paths and destinations; and recognition of distinctive sources/viewpoints (Origos) with respect to objects. Temporal factors which must be superimposed upon spatial ones to reconstruct less mature nested abductions entail: differentiating predictable intervals which occupy the displacement of objects given their size, shape, weight, density, predictable speed and potential barriers; and perceiving the degree of resistance of motion – rolling, vibrating, teetering, falling, and the like. Whether propulsion is induced by natural forces (e.g. gravitational ones) or by artificial ones (e.g. agents transmitting other objects across spatial confines) constitutes still another primary influence of temporal factors upon spatial ones – to be apprehended by abductors. Essentially, the recognition that motion, in its temporal, indexical realization (point of origin, continuance along a predetermined path, terminating point), constitutes the most influential factor in heightening notice of spatial features within events, is paramount. In fact, it is the invariance of the two coordinates (spatial, temporal) that accounts for their degree of independent objective reality (Nozick 2001: 77–82). Nozick demonstrates that invariants are never entirely objective (although some objectivity is necessary for novel inferencing), in that scientific principles (e.g., the postulate of relativity) are objective only contemporaneously with the known facts of the culture in which they are accepted. Propositions to explain invariants may be incomplete or shortsighted from subsequent knowledge-bases that rely upon distinctive procedures of measurement or different cognitive/affective dispositions. In any case, invariant and objective truths represent principles whose results are in need of reliable measurement and which are ordinarily shared by a large cross-section of the culture. Nevertheless, what is missing from Nozick’s analysis is the rather complicated process of constructing novel nesting affordances (from Magnani’s perspective) – how the organism comes to reflect upon and alter notions of such invariants, as well as how hypotheses distinctive to already accepted principles are constructed.

The present model of abductive rationality likewise transcends Colapietro’s (2009: 351) assumption that self-control is the ultimate form of rationality; as such, it questions his assertion that self-reflection is a function of agency (Colapietro 1999, Colapietro 2009: 351, 366). Although the ability to modify one’s own habits in a self-conscious, self-critical, and self-controlled manner presupposes the existence of cultural adherences, according to Colapietro
(2009: 351), habituations, these competencies only constitute the groundwork for appreciating dispositions and inclinations inherent to others – never experienced by the self. Rather than representing autonomy, these iterative self initiation-based competencies and their reflective correlates (to which Colapietro refers) may more often evidence resultative events over which the agent’s control is questionable; if control over components of an event is questionable, so likewise is agency. The claim here is two-fold: agency in events does not reliably give rise to control; and even when it does its effect is an insufficient foundation for recognizing myriad event structures/trajectories necessary to abductive reasoning. Although consciousness of agency represents a primary component in recognition of time and space relatedness within events, it is incomplete – it does not prepare children to abduce using inferences whose sources emanate from other places/orientations in the event.

Accordingly, discerning intentionality of an agent requires more than agency; it requires perspective-taking competencies beyond Other as active initiator in an event. This is where Magnani’s (2009) concept of “nested affordances” completes the picture. For older children and adults, abductive rationality must consider a host of potential resultative events that can issue not merely from particular agencies, but effects (accessed from semantic memories of similar events) that result from more latent causes. As Gallagher and Hutto (2008: 25) maintain, “[…] our perception of the other person, as another agent, is never of an entity existing outside of a situation, but rather of an agent in a pragmatic context that throws light on the intentions (or possible intentions) of that agent.” The context (the nesting of the event’s affordance) must include more than what Gallagher and Hutto imply, more than the physical and affective surround – to dispositions of mind and events, and predictions of the most likely contributors to the resultative event. Hence, agency (of Self and Other) alone is insufficient to account for the affordance’s nesting – the scores of invariant forces that act upon any unsuspecting agent or upon nonagents in the event structure, in light of the concurrent need to appreciate other event roles in constructing a dynamic system of points of view, namely, that of receivers, patients, instruments, and objects whose animacy or different animacy precludes agency status, e.g., pet rocks or propositions. Receivers, patients, instruments, and objects constitute equally legitimate participants with differing nested affordance structures of event scenarios (as do agents); their place, especially in event types which lack agency, e.g., sleeping, should not be ignored.

From a Peircean perspective, although agency is initially imperative to garner embodied experience, especially given the active role of the agent in carrying out certain events, several more complex competencies are required to construct novel, plausible hypotheses that explain unexpected happenings.
3 Peircean abduction

Early on in Peirce’s theory of logic, he asserts that some form of intuition is necessary to abductive reasoning, because an abduction requires more than constructing just any premise, but one which is novel and elemental: “[...] the term intuition will be taken as signifying a cognition not determined by a previous cognition of the same object, and therefore so determined by something out of the consciousness [...] Intuition here will be nearly the same as ‘premiss not itself a conclusion’” (1868: 5.213). Peirce is explicit that intuitive thought does not rise to the level of abduction. Abductions must encourage empirical verification through induction. Although like abductions, intuitions are elemental cognitions, the absence of verifiability of their appropriateness in events causes them to fall short of abductive status – they do not command empirical support. Abductions must rest upon hunches that are novel and verifiable, not upon any bare intuitive premise. Abductions further rely upon inferential logic, but without consulting extensive empirical data (only limited experience) or aggregates of subjective observation. In other words, only experience sufficient to permit verifiable and objective inferences is necessary for abduction to be operational – knowledge from empirical sources is skeletal at foundational stages of abductive reasoning. To amplify, abductive thought or spontaneous hypotheses/predictions can materialize upon relatively meager empirical grounds; and still the interim conclusion (abduction) may exhibit a reasonable degree of truth/plausibility to justify its elevation to abductive status. All that is necessary for an act of reasoning to qualify as an abduction is that the inference be basic, novel and plausible considering the nested affordances of the abducer.

Peirce’s concept of abduction was reformed after 1885 consequent to exposure to Duns Scotus’s writings regarding the continuum and the individual as representative of the whole (Scotus i. 1290–1295/2005: 81), together with Peirce’s consequent recognition of the critical function of Index to govern inferential reasoning. After 1898, when Peirce began to retract his earlier account (1877–1878) of abduction (or Retroduction) as a form of induction that entails abbreviated consideration of prior experiences (1898: NEM IV: 183; c. 1910: 8.227), he distinguished the two (induction from abduction). While inference is common to both processes (in that novel explanations for the C event [the surprising event] are derived in both cases largely from implicit knowledge sources),¹ induction

¹ Cf. 1903: 5.189 for Peirce’s model of abduction: “The surprising fact, C, is observed;/But if A were true, C would be a matter of course,/Hence, there is reason to suspect that A is true. Thus, A cannot be abductively inferred, or if you prefer the expression, cannot be abductively conjectured until its entire content is already present in the premiss, ‘If A were true, C would be a matter of course.’”
materializes after a series of direct encounters meant to test a hypothesis. Conversely, abductions consist in plausible hunches that surface prior to testing their accuracy.

Peirce employed a host of synonyms or descriptors to illustrate the parameters of abductive reasoning: insight (1903: 5.181, 5.604), compulsive proposition (1903: 7.622), containing a degree of veridicality/truth value (1903: MS 313: 15), imagined reactions (constructed from prior experiences) prefiguring habits in actuality (c. 1902: 5.538), and, not least among them, recommending a course of action (1909: MS 637: 12).

Abductions arise consequent to compulsive notice of a place/object within a place; they assert themselves “like a flash” in the moment. These Objects of abductions are moments in lived experience (in Secondness) that compel notice via Peirce’s Index: “The index [...] takes hold of our eyes, as it were, and forcibly directs them to a particular object, and there it stops” (1885: 3.361). The compulsivity of the Object regularly takes the form of attention to an entity/feature in a particular time and at a particular place. Similarly, Objects that ground abductions “brutely direct the mental eyeballs” of the observer in Secondness (1908: 8.350).

Underpinning abductions are unconscious mental constructions (1903: 7.624): “[...] Every percept is the product of mental processes [...] except that we are not directly aware of them [...]” Since perceiving objects does not necessarily involve awareness/consciousness, it is insufficient to qualify as an abduction – it does not rise to the level of a judgment. Although noticing entities in their contexts surfaces consequent to recognition of object attributes, such does not spring from conscious deliberation. Here, object distinctions are noticed without analysis of their functionality in events. These apprehensions of sensory data fall short of a classificatory operation, e.g., all balls are round and bounce. Although Peirce asserts that apprehensions of objects are “not the first impressions of sense” (1902: 2.141), he intimates that they only extend slightly beyond sense impressions – to rather simple mental operations consequent to manipulation in embodied experiences (Anderson 1986: 147). To illustrate, recognition of an object or an observation that a particular ball bounces well, demonstrates mental processes just beyond first exposure to sense data and do not rise to the level of a “second look back” involving memories of past events necessary to retroductions (a prime component of abductions). Analyses of previous experience in light of present experience require more complex mental operations – binding elements of events to determine explanations of their influence in producing the C event (unexpected happening).

Generalizations or classifications, however, reveal the impact of sense experience (1903: 7.643). The very nature of these generalizations, or as Peirce terms them, “perceptual judgments,” is to determine the function of contributing
events to an unexpected consequence: “There are several other points of contrast between the perceptual judgment and the percept that are calculated to exhibit their disparateness. The judgment, ‘This chair appears yellow,’ separates the color from the chair, making the one predicate and the other subject. The percept, on the other hand, presents the chair in its entirety and makes no analysis whatever.” Merely perceiving through sense modalities involves notice and recognition of an entity, but without the mediation inherent to observer generalizations – predications regarding the entity’s perceptual/functional characteristics. Judgments are unique in that they contain classificatory stored knowledge of regularities of entities/events that imply their affordances within events, giving rise to observations of functionality within event aggregates.

Peirce’s characterization of abductions as “recommending a course of action” makes plain their dependence on making generalizations inherent in judgments (Kapitan 1992: 12). Such judgments entail inferences that qualify as abductions, in view of their propositional and classificatory nature. As such, inferences following from diverse embodied experiences (Self and Other) culminate in a conclusion not from any single experience of sensorimotor manipulation, but from a judgment that recognizes commonalities/differences across embodied experiences of diverse players. A different type of manipulation emerges when judgments of others’ contributions in events guide inferences – that of mental manipulation to determine causes from effects. As such, the influence of each contributing factor to the end-state is weighed; and a novel, adequate conclusion is proposed, excluding immaterial factors and embracing factors according to their degree of influence on the event and the organisms observing the event. Moreover, the relevance of spontaneity and insight in recommending a course of action likewise reifies the relevance of which affordances are nested for different organisms – since without apprehension of particular affordances, insights depending upon such recognized, unbidden, novel suggestions are hard pressed to materialize. Peirce recounts a particularly poignant family incident in which his brother, Herbert, in a “flash” of “insight,” made a determination (fostered by an earlier experience) to instantaneously cover a woman’s burning dress with a rug to smother the flames, saving her from peril (c. 1902: 5.538; c. 1906: 5.487 n1). Herbert abduced in that he implemented a strategy (which earlier occurred to him in a flash), constituting the best course of action available to him – to salvage the person and dress. Herbert’s intervention materialized after little opportunity to consider the effect of each factor or to test each empirically. Possible competing but less effective remedies include: pushing the enflamed person onto the carpet, dousing her with water, removing her dress, etc. Although the judgment need not amount to the best explanation or the best course of action, it must represent a plausible remedy (often the most plausible) in the context of the abducer’s affordance network. The explanation needs to
convincingly evince a successful result given the surprising event (the igniting of the dress). The judgment (quickly covering the ignited item with a rug) qualifies as a viable abduction, likewise because it is not an outgrowth of extensive empirical support/deliberation (albeit fallible). Despite its fallibility, the premise qualifies as an abduction, given the likely success of its intervention for virtually any agent: “It is an act of insight, although of extremely fallible insight” (1903: 5.181). The upshot is that abductions are subject to alteration/reformulation, given the potential of fallibility – they constitute abductions despite their incompleteness/overextension provided that they rest upon sound/plausible logic.

Even at early stages in development, abductions can legitimately be modified or withdrawn according to the state of the abducer’s affordance system as Magnani argues (2001; 2009: 355), although the latter is less likely. Further, this modification can be derived from an instinctual or a discovery-based kind of affordance, as Magnani (2009: 346) argues: “[...] organisms already have affordances available because of their instinctive gifts,” but also they can dynamically abductively “extract” natural affordances through “affecting and modifying perception.” Magnani’s latter type of affordance (discovery-based) can be extrapolated to include over- and underextensions. Modification consequent to incompleteness is obviated in constructivist accounts of concept formation when it is discovered that factors beyond those originally postulated likewise influence a surprising event, e.g., an assumption that a step caused a person to fall, later ascribing the fall to slippery conditions and lack of vigilance. Modifications of abductions consequent to overextensions surface often in the face of associating Peirce’s Immediate Object (consideration of all instantiations of the Object) with the same sign and interpretant, especially in the naming enterprise. Children as well as adults construct conceptual parameters of referent objects often upon meager instances of language use, as in all four-legged animals (Immediate Object) must be “dog” (sign). As such, children’s abductions (prior to modification) appear to rely to too great a degree upon Peirce’s Dynamic Object – conditions suddenly emerging in the moment. While the value of knowledge derived from empirical sources is not inconsequential, it does not define abductive reasoning at early ages. Nonetheless, without some instantiation to support the hunch, the veridicality of inferences and their modifications would be undetermined.

4 The surprising event in the abductive turn

According to Peirce (c. 1901: 7.220), abductions must offer a viable explanation (explanatorily adequate) for a C event (carrying a degree of surprise) in which consequent states of affairs are explained by a latent cause(s). Peirce’s model
presumes that unexpected end-states constitute the substance from which plau-
sible inferences (abductions) are formulated. Abduction-making, then, emanates
from subsequent instantiations of the C event. To reliably increase the likelihood
of event occurrences, the primary conditions that are near at hand to the C event
(latent as they may be) need to be identified; although, in some cases, such
identification may be difficult if affordances of events are latent and unidentifi-
able. Accordingly, contenders for abductive inferences must be narrowed from
the pool of immediately preceding and co-occurring events (mere coincidental
ones) to those that bear upon the logical constituency of the C event. Abduction-
making requires a connection not often apparent in the immediate context
surrounding the consequent event – reasoning must go beyond perceived events
to causal, less perceivable relationships between events/states of being. Still,
recognition of regularities within immediate and mediate events is crucial to
materialization of inferences to the mind of the observer. Determining which
events are truly causative/influential can be short-circuited by precedent or
concurrent events, unwittingly perceived to be factors (even accepted by an
entire culture) in producing the C event. Contributing factors for Peirce must
arise from a surprising consequence and must be a plausible explanation giving
rise to the C event. A C event, however, need not be objectively surprising – it
may be so for one observer and not for another, given the knowledge base and
experiential composite. In fact, Woods (2013: 367–368) intimates that the sur-
prising event is not inherently surprising. Rather, apprehension of inferior/
incomplete “cognitive resources” to resolve what gives rise to the unexpected
C event is a necessary experiential basis to revise hypotheses. Woods indicates
that this “ignorance problem” does not necessarily result in abductions; instead,
“subduance” or “surrender” may constitute the agent’s alternative approach to
resolving the “ignorance problem.” Woods suggests that an agent enters into
subduance, surrender, or abduction consequent to a decision, albeit often with-
out extensive deliberation – in a “flash” of “insight,” as Peirce describes it.
While deliberateness requires choice, it need not involve conscious intervention.
As such, Woods (2013: 367–368) asserts that an agent selects a course of action:
either supporting new schemes (subduance, abduction) or resigns himself to
inactivity (surrender). Woods does provide for the possibility that abductions
can temporarily preserve the state of the knowledge-base, when the agent
reconciles himself to already established premises. But, the “ignorance preser-
vation” is “productive,” not limiting (as in surrender), because the hypothesis is
shelved for future (“subjunctive”) application. What still warrants investigation
is which factors (subjunctive, factual), at any one point in time, are likely to
convince the agent to decide in favor of one or the other approach to resolve the
“ignorance problem,” and how to fix upon the relative weight of each
contributing factor. For example, the effect of multimodal strands (the interplay of emotive, cognitive, and linguistic factors) upon the decision-making process needs further examination (see Thagard 2007: 227, 244). The issue of what constitutes notice for further explanation, and the process of attaining satisfaction toward resolving ignorance problems deserve significant attention.

Philosophical characterizations of Peirce’s abductive process are largely in keeping with the assertion that abductions need not reach ultimate explanatory status – they are, in fact, a kernel of a premise that can undergo many turns of alteration. While maintaining the surprise event component, they depart from Peirce’s assertion that abductions must proceed to the best explanation possible, e.g., Aliseda (2000) Lipton (2004). The former dissects mental processes necessary to arrive at the best explanation possible – expansion (additiveness) and revision consequent to an anomaly (Aliseda 2000: 54–55). Aliseda’s model appears to emulate Piaget’s notion of assimilation and accommodation, in that assimilation maintains the same hypothesis in additional applications; accommodation, on the other hand, requires alteration to the hypothesis consequent to findings which conflict with the original premise. While the element of surprise, novel but not unexpected happenings, (Aliseda 2000: 57) is present in both expansion and revision in that either a novel stimulus surfaces to add or to alter an explanation, revision appears to supersede the surprise element and hence may transcend the simplest of abductive processes. Rationale emanates from Aliseda’s (2000: 57–58) assertion that revision entails a process beyond expansion, namely contraction. Contraction, like Piaget’s accommodation, results in a modification of the hypothesis itself. Like Piaget’s assimilation, expansion appears to suffice to settle on a plausible explanatorily adequate premise, without changing the structure or substance of the hypothesis.

Lipton’s model dispels Peirce’s claim altogether. The upshot of Lipton’s contention is that what is accepted as the best explanation for a surprising event (even across cultures) is not invariant for next generations (Lipton 2004: 60). The “likeliness” or likelihood of an explanation cannot define its acceptability. Lipton follows with the claim that explanatorily adequate explanations need to determine the plausibility of the premise (Lipton 2004: 61). “The central idea that explanatory considerations are an important guide to inference is thus meant to steer a middle course between triviality and manifest falsity” (Lipton 2004: 62).

Although the C event consists in a single, resultative state of affairs as an isolated Second, it must suffice as the raw material to motivate canalized logical inferencing. Data points emanating from tested hypotheses (inductions) are not part of the equation. The fact that abductions do not rest on empirical findings from tested hypotheses (inductions in Secondness) but instead upon compulsive hunches from insights that inform the “why” of unexpected events that may
have even been withdrawn and modified (Magnani 2001: 25–29), obviates the influence of Thirdness in the abductive turn. To formulate best guesses, children cannot simply draw upon similar event scenarios (since the event is unexpected) in Secondness, but must transcend momentary appearances, especially those for which ego-derived assumptions can infect objective relations among events, and their causative weight.

This line of reasoning is well-founded, especially in light of Piaget and Inhelder’s (1966/1969: 94–95) findings – that children cannot transcend the Concrete Operational stage to the Formal Operational stage (ascertained typically at 11;0) until they learn not to settle upon physical (primarily visual) states of affairs as the determinative factor in the quest for underlying logical explanations. This illustrates how hasty assumptions can lead children to settle upon inaccurate/implausible conclusions. Here, children did not exploit “the causal truth preserving feature” or features; they merely assumed that a single patent (sensorially defined) feature forms the underlying, static cause. But, if the conclusion is accurate or the effects are fruitful, as Magnani (2009: 389–390) reminds us, hasty generalizations can be an asset. Balancing visual arrays with affordances that are invisible in the quest to determine an explanation for a surprising event (without ignoring the visual) must be mastered. Hence, casting the observer in an objective role – as one who extracts invariant truth value not merely from her role in the immediate context but from latent principles which need to be uncovered via a single inquirer’s mental considerations is paramount.

Accordingly, observations that contribute to abductions must additionally consist in invisible forces present in Other’s participation and in nature to construct plausible inferences from the unexpected consequent event, e.g., initial notice of a crushed object in a toy box followed by the well-formed conjecture that such was consequent to its location in the box, as well as the combinatorial weight of several overlaying objects pressing upon it. It is well established that unexpected events (as opposed to expected ones) in which others have a defined role elicit search for cause-effect relationships (Hastie 1984: 52), especially events portraying surprising attribute combinations (Kunda et al. 1990: 554). Consequently, Peirce’s assertion that surprising events are pivotal to abductions is supported by empirical findings. In short, working backwards from the surprising event to determine the weight of contributory events (likewise critical in the formulation of prospective abductions) depends chiefly upon the means to advance primary semiotic processes – the indexical and propositional competencies of the observer. In other words, to abduce, children need to proffer novel propositions motivated by infusions in Firstness but without allowing them to be determinative. They likewise need to manage propositions in Secondness, such that patent direct observations of apparent
states of affairs in the moment are balanced with more latent factors. But, balancing factors emanating from Secondness requires Thirdness-based operations, in view of the influence of the Logical Interpretant in formulating propositions. Moreover, because spatial knowledge is so fundamental in early experiences perceiving affordances, its role generating plausible hypotheses to encapsulate explanations for surprising events is indispensable. Similarly, the codification of a myriad of deictic viewpoints (distinctive locations and orientations in space) is pivotal in order to recommend viable courses of action that emanate from plausible hypotheses. Hence, deictic postures of mind as memorialized in perspective-taking competencies represent major strides in the establishment and refinement of abductive reasoning.

5 Perspective-taking in the abductive turn – deictic postures of mind

Adequately addressing the pivotal influence of Origo switching in the abductive turn requires tracing how Index individuates shifts in location, orientation, and Origo. Index’s mobilization and attentional force together account for how events can be decomposed and recomposed to fathom implied causes for unexpected events. In fact, appreciating the deictic nature of event participants is responsible for primary advances in spatial and causal inferencing necessary to abductive logic because Index’s overarching purpose is to attend to spatial boundaries and their alterations. That these dynamic spatial and temporal locators are indispensable to abductive reasoning is obvious; their means to structure and reconstruct events is unparalleled.

Tracing the influence of Index upon reasoning begins with more static orientational factors (such as gestural use) and moves to more dynamic ones in which Index individuates a class of objects (West 2011a: 150; 2013: 127). Capitalizing on the ultimate role of Index in determining the most adequate explanation possible for unexpected/puzzling consequences, Thagard (2007) reveals a surprising similarity between the emergence of ontological universals and particular epistemic competencies. Accordingly, the interface between the ontogeny of legitimizing perspectives (deontically and epistemically) and ontological advances such as the validity and relevance of container schemas and source-path-goal scenarios is paramount in determining components basic to early inferencing and, ultimately, abductive reasoning. More specifically, a foundational spatial system of points of orientation (which Index affords), impels novel predictions of outcomes that entail epistemic and deontic complexions particular to the players in the event, which is
foundational to abductive thought. In other words, the subjective perspectives of the involved agents, together with more objective principles discovered through cognitive manipulation, coalesce into what Magnani (2009: 393) terms “theory presentations.” As a consequence, agents are better able to problem-solve since their predictions would be informed by a dynamically alterable system of action and propositions, e.g., how any observer could perceive spatial arrays from particular distances/orientations. As Hastie (1984: 54) asserts, “expectations about other normal states of the world will determine which factors are selected as causal or explanatory events.”

Woods’ “ignorance problem” of how near objects can become far objects and the reverse from distinct Origos and vantage points gives rise to an abduction if the agent alters behavior or mental schemas to resolve which factors contribute to the location characterization. Points of view or mental states establish how postures of mind (applied to geographical and social genres) at distinct stages in development inform the worldview which children adopt, from which abductive logic derives its basic assumptions. These foundational assumptions translate into retroductions – accessing stored memories of grounded cognitions. These grounded cognitions – self and other action schemes/episodes – in turn are then synthesized by virtue of comparisons that inform event classifications or categories and result in new physical/mental manipulations of previous assumptions. Nonetheless, event categories include, but are not limited to: affective and cognitive states of being in which agents may be irrelevant and often unknown, e.g., orientation and mobility during a power outage, resultative actions/states (e.g., discovery, arrival, winning), and non-resultative actions (e.g., wiping a clean, dry table). Exposure to different event types, different roles, and adopting beliefs of other event participants constitute forums to measure advancement of viewpoints, critical in constructing plausible premises for a puzzling consequence. Via these opportunities, children try out (manipulate) how distinct event types and participant roles contribute to resultative event(s). The interplay of these factors transcends the effects of intersubjectivity discussed by Zlatev (2008: 215), in that to abduce (to propose novel plausible premises) children must draw upon cognitive and logical skills beyond “the sharing of affective, perceptual and reflective experiences.” The purpose of an abduction may rather be to aptly explain physical phenomena to one’s self or to avert a calamity for unsuspecting others, not necessarily to share experiences, especially in view of Kunda et al.’s findings that others participation in unexpected events is more salient than one’s own (1990: 554). Sharing event roles may not necessarily result in recognition of the legitimacy inherent in roles apart from, or foreign to, one’s own experience to the degree that assuming Other’s perspective does.
Assuming diverse viewpoints appropriate to each context eventually requires fine-grained analyses (both conscious and unconscious) of several spatial factors. Establishing which forms of Index best function to germinate ontological changes, who or what serves as Origo within particular types of events, and when to exercise the foresight to shift perspectives are paramount to interpretation of early experience as it is memorialized in retrospective representations. This latter competency draws upon deliberate but impromptu judgments as presented in an “ignorance problem.” These forms of Index, when employed to formulate hypotheses, qualify as retroductions/abductions in the Peircean sense. Via retroductions (predictions from consolidated memories of past events), Secondness forces upon us templates of experience, whereupon salience of regularity is imposed upon the mind. The premise is that knowledge of the temporary nature of Origo’s vantage points represents implicit knowledge, selected unconsciously and often without taking note of reasons for suitability or verifiability. Likewise, because selecting Origo and its consequent referent points materializes in a flash, typically without conscious deliberation, Peirce’s components of compulsiveness and insight emerge as defining variables of implicit knowledge. The element of compulsivity is evidenced especially with respect to apprehending cause-effect relations inherent in abductive reasoning, e.g., how distinct Origos invite particular complexions of seeing/interpretation. This critical deictic knowledge, together with its daily application to distinctive practical genres obviates the influence of tacit knowledge in arriving at hypotheses bearing a workable explanation.

Conversely, explicit knowledge does not ordinarily underlie deictic postures of mind, in that Origo selection is not ordinarily taught. Nonetheless, active instruction and/or deliberate pondering (inherent to explicit knowledge) can be implemented to consciously identify where and how it is that distinct orientational systems diverge, which may indicate when Origo switching within each system is likely to affect the complexion of an event (e.g. giving, receiving). While both implicit and explicit knowledge can derive from learning paradigms, explicit knowledge typically emanates from information taught via intervention strategies consequent to principles introduced either by others’ or by the learner’s self-imposed analysis. As such, explicit knowledge does not ordinarily give rise to hunches, guesses or abductions. Because explicit knowledge consists in what learners are told to think (either from self or from another), it does not often directly give rise to discovery, or to the subsequent search for supporting findings.

Identifying Origo and Origo switching in diverse scenarios even within a single cultural perspective arises from implicit knowledge, a rather complex process – spanning over seven plus years. At the outset, Origo selection initially
relies upon direct self-participation in events – self-manipulation and observation of how entities function in the world (either as self-impelled or non-self-impelled agents). Gradually superimposed on these sensorimotor schemes are the various and sundry observations (self as observer of an episode) in which actions of others and consequent interactions with objects have effects. This action-based schema that recognizes Origo (not self) as the spatial center of the episode gives rise to narrow predictions, which may not result in the best explanation possible. Later, better explanations are more likely to materialize, which, after incorporating stored instances of other as Origo, infuse regularity into the prediction. This materializes when perspectives are attached to orientations, not randomly to particular individuals/contexts. These predictions are initially governed by diverse retrospections of action schemes, memories verifiable by enduring objectivized representations of others’ bodily experiences. Nonetheless, unless predictions translate into widely applied standards, the hypotheses that issue will be subject to several rounds of revision, because without objectivity, predictions are devoid of explanatory content. After adequate testing, hypotheses gain objectivity, and acquire more explanatory adequacy, when they transcend individual postures and acquire objective orientational principles – a proclivity which emerges between 3;0–4;0 when conjecture of consequences to others surfaces (Pillemer 1992; Tulving 2005; Kunda et al. 1990). With increased apprehension of social applications of Index, Origo selection becomes more logical and more amplified, such that observation of others’ systematic interactions inform the inference. As such, children generate hypotheses that bear marks of the non-participating onlooker, assuming another’s perspective without directly experiencing that Origo’s embodied experience. Inferential reasoning emanating from this more systematic, more objective paradigm invokes predictions more universally functional and even more suitable to particular, idiosyncratic approaches. In fact, non-participation in an event or participating contingent to another’s role/perspective often gives rise to a more objective viewpoint, frequently critical to developing abductive reasoning competencies, e.g., recommending a course of action for the objective other.

6 Episode-shifting in the abductive turn

A developmental perspective accounting for how abductive logic emerges, charting Index’s role within that paradigm, is paramount. It is responsible for moving children from attention to co-occurring perceptual factors, to rationale that balances patent with latent factors. The latter process is enhanced via
acknowledgment that events, considered to be an inherent part of the episode, can be attenuated spatially and temporally from the surprising consequence. Transcendence beyond a particular event structure or episode such that an event can define more than a meager set of scenarios marks the threshold to abductive rationality – beforehand, novel configurations and cause-effect possibilities are often unrecognized. Early on in the ontogeny of abduction, courses of action are bound to the same outcome, such that particular events are intrinsically associated with other events and with the same consequence, e.g., assuming that the host wins the competition, and that success is necessarily a direct result of the condition/location of the playing field. The assumption that a co-occurring event causes the puzzling event fails to qualify as an “ignorance problem” in Woods’ paradigm; the agent does not consider other factors as possible contributors – the “explanation” is proffered upon patent coincidental states of affairs that do not even qualify as hasty assertions. It is not embodied, sensory experience (typically visual) that controls, but instead working memory competencies of orientation switches upon which well-constructed inferencing relies. The number of units that can be considered simultaneously on-line, three at 4;0 (Gathercole and Baddeley 1993: 25), militates against well-formed inferencing prior to 3;0.

Construction of events into episodes begins at approximately two years of age (Harris and Kavanaugh 1993: 39, 55), graduating to inferencing which relies upon more expanded WM competencies at four years of age (Perner and Ruffman 1995: 540). These events are unquestionably indexical given the recognition of their sequencing into episodes or temporal structures. By 4;0, events are organized according to discrete temporal schemas (Tulving 2005: 34) – not merely invariant cause-effect connections. Rather, within and across event relations are organized to determine which feature of the event(s) is primary to the comprehension of the episode. Based on Perner and Ruffman’s studies, episodes begin to take some rudimentary form at about three years of age. This is so because children must have already apprehended the epistemic and deontic perspectives of another, prior to envisioning the other in an episode and prior to assigning another a plausible course of action. In other words, children must first appreciate different perspectives (codified in productive use of deictic pronouns), to determine how objects conform to invariant natural principles in world knowledge schemes, and must employ these tools to view events objectively, before recommending a successful course of action for another.

Viable courses of action can only be recommended after 4;0, when greater appreciation for mental states develops (Pillemer and White 1989; Perner and Ruffman 1995; Pillemer 1992: 254). In Pillemer and White’s (1989) “fire alarm study,” after experiencing a fire alarm incident in which children were required
to leave the school building, the children (at three distinct intervals thereafter) were asked to verbally reconstruct the events of the fire alarm incident. The four-year-old children reliably maintained the actual event sequence in their accounts, independent of the interval between the actual experience and the verbal reconstruction (two weeks, one year). The four-year-old children, as opposed to the three-year-old children, had the means to index events into coherent episodes to remember and provide a reasonably accurate sequence and set of happenings. Such integrated event aggregates appear initially to be founded upon retrospective memories of self-experienced events. But later in development, prospective events grounded upon abductive reasoning surface, when the means to self-reflect on participatory event roles emerges at 4;0 and thereafter (Tulving 2005: 34). This “self-travel” is referred to as “autonoesis” – conscious reflection of events taking place in times and places other than the actual. “Autonoesis” allows children to “travel mentally in time and space” (Tulving 2005: 7). Traveling mentally requires children to index events according to two temporal and spatial points of reference – the now and the then and the here and the there. It permits them to project, not just retrospectively isolated past experiences, but to streamline these events in terms of the particular Origo (self, another) called for. Once Origo transcends an ego defined viewpoint and is established for the event under consideration, children can envision not merely formulaic event paths but can substitute players and factors in ultimate episodes. Well-constructed inferences about how players should perform or about which factors are responsible for unexpected happenings rely upon deictic competencies – the means to mentally consider a minimum of two temporal axes: the now and the then, and two spatial vantage points (the near and the far). According to Tulving (2005: 34), the success of four-year-old children at recalling the fire alarm events is achieved by representing them via language with adult interlocutors. Talking about event sequences requires accessing actual remembered events from Long Term Memory (LTM) and reviewing them in WM, constituting a form of rehearsal, as Tulving intimates. Rehearsal, in turn, solidifies the relational components of events – predictable invariants of object movement and orientation within the event, and the orientation of Origo looking at the event from the outside. Nonetheless, the onset of these differential Spatial and temporal shifts would be hard pressed to develop by 4;0 without the intervention of deictic terms (“I,” “you”). They codify a viewpoint role with respect to an event. Deictic pronouns determine who is Origo when viewing the event and classify speaker as establishing the complexion of the event, i.e., “I” characterizing speaker as viewer from outside the event.

This early propensity to conceive of events as organized episodes (beginning, middle, end) with diverse cause-effect associations serves as the
foundation for the construction of templates to hasten subsequent storage within Working Memory (WM). Action structures are particularly ripe to discern beginning, middle, and end structures, given the salience of discrete, differentiated behaviors as countable parts of episodes. In contrast, state-based events, e.g., sleeping or waiting, despite their validity as episodes, are less likely to possess discrete, axiomatic sequences. Recognition of episodic contributions to the surprising event frames how inferences stored in memory reflect experience. Hence, arriving at workable inferences that account for how shifting Origos effect viewpoints of objects, locations and orientations within episodes (provided through manipulation of the self and the other within distinctive locations toward establishing new actions) is indispensable to abduction revisions.

The nature of working memory as a limited but refreshable temporary storage system (Eysenck 2001; Baddeley 2003: 675), accounts for its critical role in abductive reasoning in that it hastens spontaneous reasoning of a veridical and prospective nature; and the very character of abductive logic provides for recommendations for a course of action, building prospectives from retrospective cognitions. By their very nature, prospective cognitions entail novel conclusions about episodes, although they often rely on some retrospective memories (memory of past events). In this way, prospective (forward-thinking) conclusions transcend already actualized events and conventional reasoning by transforming them into interventions to avert a seemingly unforeseen tragedy or by proposing a more successful outcome.

Still later in ontogeny, when perspective-taking is more fully operationalized, children can mentally manipulate events by projecting another person in a constructed space and time, taking portions of recalled events and using them as points of departure to construct prospective episodes. This more advanced abductive reasoning materializes only when children can transcend “self-travel” and “self-reflection” to see events from outside, objectively or as another sees them. Such often involves recognizing and envisaging perspectives that may conflict with the child’s own. It is here that Woods’ (2013: 367) concept of “Subjunctivity” applies – α and ~α can both exist side-by-side within the child’s repertoire, i.e., an orientation of one Origo does not negate that of another. These competencies are not typically manifested until eight years of age (in Formal Operational thought; cf. Piaget and Inhelder 1966/1969: 94–95). In short, generating novel, plausible hypotheses requires the means to coordinate not merely physical schemes but mental propositions as well.

Perspective-taking skills supply just such mental operations – to project self/other into new venues and to assert a viable rationale for unexpected eventualities within those events. Events must be mentally coordinated to explain the eventuality, which relies upon a means to mentally manipulate the
sequence and weight of each event in relation to consequent events. As such, the mental operations that Piaget determines to be essential to Concrete and Formal Operational thought (compensation, reversibility, and identity) unquestionably underlie abductive reasoning. Russell (1996: 83) makes plain the indispensability of reversibility to perspective-shifting, which is foundational to asserting plausible hypotheses (West 2013: 78, 122). Furthermore, coordinating these perspective shifts via simultaneous projection into different orientations gives rise to increasingly more “abstract forms of remembrance and imagination” (Martin et al. 2008: 303). As such, more systematic logic is needed to remember past episodes, and to use them to anticipate subsequent resultative events. It is obvious then that states of mind (of self and other) must be projected as roles into event and event viewer slots which children foresee, providing a forum for the implementation of operations necessary to abductive reasoning – coordinating subjunctive with factual affairs and integrating affective, logical, and experiential genres.

As alluded to earlier, beginning at 3;0 (West 1986: 115), discourse features (deictic terms) used to reconstruct events are codified as Indexes which hasten perspective-taking, in that they encode social and conversational roles and shifting orientations and locations with respect to those roles. West (1986: 115, West 2011b: 95, West 2013: 30) demonstrates the indispensable function of deictic terms to demarcate spaces and orientations – proximate and distal from speaker’s perspective (Origo as an on-looker of the event). These deictic terms (used as indexical legisigns) hasten abductive reasoning in that they transcend self-based experience, arriving at an awareness that others (more particularly the objective other) can exist in the same roles (as narrator and event participant) as the self. The apprehension that others (more particularly the objective other) can assume discourse role functions (constituting Origo of the event while standing outside the event) and that those functions vary with the viewer assuming the role (speaker, listener) is paramount-highlighting the vital role of language in the abductive turn. “I” suggests to the listener that any spatial (locations) or temporal issues (events) use speaker’s orientation as the reference point/Origo. It is unquestionable that self-reflection and apprehension of diverse mental states are critical to abductive reasoning (recommending a workable course of action), and that Indexes (primarily linguistic ones) serve a primary function in encoding other points of view and mental states. Moreover, the reciprocal nature of these indexical terms fosters recognition that the course of action to be recommended in the abduction must consider the particular point of view and legitimate mental state of the participating parties. To recommend a functional course of action for another, children need to assume a viable perspective outside the constructed event aggregate containing the surprising
event and must anticipate how the event participant is likely to respond given the particular features of the spatial and temporal context – a subjunctive enterprise. Hence, embodied experience of effects on the self, together with reflection on the invariant effects of objects and objective principles upon others, permeate and forge fresh enclaves into propositions – the substance upon which abductive logic is constructed.

In deictic scenarios (especially during play when dialogue flows with an imaginary other), children have the greatest opportunity to draw from retrodictions of remembered episodes to construct plausible explanations for surprising events. Constructing novel turn-taking paradigms within a new world, that of pretense, transcends prior dyadic engagement and ultimately enhances subjunctive practice, hastening abductive reasoning. This is so, given sustained practice naming role shifts in a natural context. This type of practice supplies a running account of shifts in the Origo viewing the episode, critical when proposing suitable explanations and courses of action for surprising consequences. Accordingly, the ability to manage deictic scenarios underlies abductive reasoning, in that it spontaneously gives rise to objectivized explanatory propositions for event templates – substituting/deleting/augmenting participants and contributory event types as needed. With deictic competencies, children can construct novel explanations for event templates in a “flash” of insight, when they determine commonalities and distinctions among event players, their relation to particular types of event trajectories, and complexions of event consequences. With deictic advances, children exhibit a greater means to coordinate events (even those without apparent relationships). This elevated competency rises far beyond the development of premises that rest upon particular agents’ engagement in prescribed event types. Although children initially learn about players, event types, and their paths via embodied experience, their novel projections of plausible courses of action in the face of unexpected situations rest upon spontaneous consolidations of Origo orientations and object locations, together with the invariants of object and event affordances. Such flexibility becomes apparent upon the realization that neither they nor particular others necessarily have a direct effect on event consequences and that objects and complexions of events may militate in favor of or against particular consequences. To illustrate, players’ roles may take the form of an observer (outside the event) or of receiver/experiencer (inside the event), not necessarily of agent.

That which underlies the transition from early to later inferential thinking is the issue of going beyond the information given, and, in doing so, children increasingly refer to non-immediate events. Neither the object nor the state/action is required to conform to their functionality in the real world; children are at greater liberty to conjecture as to which types of players can launch which
events and which events can follow from others. They gradually become free from dependence on the actual to define possible templates of cause-effect relations.

Benefiting from deictic scenarios, initially embodied in indexical gestures (gaze, pointing) and by virtue of indexical legisigns “that” to refer to retrospectively experienced objects within already actualized scenarios is paramount. Afterward, Index becomes even more indispensable when it innovates potential event paradigms that materialize when it coordinates Origos (via deictic terms) experiencing similar locations/orientations/distances from objects and when it makes such relevant to event templates. In event templates, agents, receivers, experiencers, and instruments are accorded differential statuses and effects upon end-states.

Children formulate inferences initially from direct experience using attentional Indexes to refer to discrete objects. Thereafter, they abduce, in that they eventually attach novel, invariant sequences to templates of players and of events. They transcend the assumption that one player/event is intrinsically attached to another, and do not associate events and players merely because of spatial and/or temporal continuity, connecting them existentially. In other words, inferring a connection by virtue of co-occurrence in the real world is not adhered to. With indexical advancements, it is not assumed that co-existing events/objects belong to the same episode – each can exist apart from the other. One event need not (by virtue of its material existence) bring into existence neighboring events. This does not preclude useful presumptions that particular events serve as affordances for other events. An inference surfaces when the occurrence of one of the events is inextricably related to the other, sequentially (such that by their very nature one event necessarily precedes the other) and locatively (such that one event is associated with the same place as the other). In short, the fact that a single cause is only early-on assumed to give rise to one and the same effect (Harris and Kavanaugh 1993: 39, 55) illustrates how static inferential reasoning becomes replaced by more dynamic, abductive logic, in which outcomes often have several proximate causes.

This competency strongly suggests that children have the means to abduce – to determine, in a flash, the effect from the substantive facts and to advocate a plausible course of action for others. In any case, especially in play scenarios, children begin to substitute their own constructed consequences (exercising what Woods [2013: 367] refers to as subjunctive reasoning), such that real-world expectations are afforded to play objects that may defy such functions, e.g., a teapot should be emptied of its contents (independent of whether it carries liquid) in the pretend scenario (Harris 2000: 124). Prior to arriving at higher levels of inference, children perceive in pretense scenarios a relationship
between a single cause and a conclusory event. If a particular causal/contributory event is not associated with more than one effect, there exists a “frozen” cause-effect relationship; and hunches are unlikely to form in context such as these, especially given strict conformity to retrospective events such that novel, dynamic event relations necessary to abductive reasoning are precluded. Abductive logic ultimately consists in constructive prospective event paradigms that are subject to sequence displacements, and participant substitutions/deletions. Once episode components are transformable, conclusions transcend association to pre-ordained causes to allow for cause-effect event conjecture. Nonetheless, as Peirce notes, conclusory processes that qualify as abductions surface suddenly and quickly, without planning.

According to Peirce, abduction entails a “flash” of “insight,” in that the unexpected consequence happens suddenly (without expectation) and plausible explanations asserted to have caused the puzzling event are likewise spontaneous (absent contemplation). Similarly for Peirce, abductive reasoning is necessarily systematic, in that none of its components contravene others with respect to the contributing assumptions. Moreover, an awareness of plausible courses of action requires a determination that other courses fall short of the proposed recommendation. Such logical competence entails starts and stops – hypothesis revisions that rest upon an awareness that the recommended course of action does not conflict with any of the other events leading to its recommendation.

7 Conclusion

Abductive reasoning unquestionably relies upon subjunctive skills – considering others’ legitimate points of view and knowledge of event types, codified in deictic competencies. The representational tool driving these competencies is none other than Peirce’s Index; it supplies the directional vehicle to spontaneously shift roles and orientations as well as to apprehend objective cause-effect event templates. Recommending a course of action to another (an ultimate component of abductive reasoning for Peirce) relies on an onlooker’s means to apprehend the affect and cognitive dispositions of the other within the event. The consideration entails: recommending a course of action, according to Peirce, determining (in a flash) how one should proceed in a projected situation in the face of an unexpected consequence, and considering all of the factors, not merely one cause to one effect. Abductive reasoning requires quickly and confidently fastening upon a sought-after remedy/course of action, and determining the contribution (severally and individually) of each effect to what had been a puzzling outcome (over other contenders), together with the quality of proximal
and distal causes that coalesce to produce the surprising consequence. A systematic, relatively objective, and explanatory point of view needs to be embraced to qualify as abductive reasoning (to assert a plausible, novel proposal). Such is not ordinarily ascertained until subjunctive skills are in place – until a recommended course of action fits the complexion of both the event and its participants. Index is a primary mover in the process of noticing others’ end states, in viewing events as an on-looker. A course of action is recommended in a “flash;” the reflection may not rise to the level of conscious predeterminations. The behaviors that contribute to the flash of insight (plausible inferences) are likewise unconscious/automatic – linguistic and social indexes (both within real and pretend scenarios). These deictic devices moderate the very social and logical competencies necessary to identify diverse event structures and to determine their contribution to an originally unsuspecting consequence. Ultimately, these dynamic indexical tools determine whether the proffered recommendations to others for a course of action meet muster for abductive reasoning, because they establish, trace, and modify event and discourse shape.

References


**Bionote**

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