

Recursive Modeling: A Selfing Path for Outliers

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Abstract

Observational learning has traditionally been understood as a process through which individuals acquire new patterns of thought and behavior by modeling others. Whether expressed through direct observation or internalized representations, conventional modeling assumes the availability of exemplars capable of guiding development. This assumption becomes problematic when examining outliers whose lives exceed the horizons represented by prevailing norms.

Drawing upon observations from the study of exceptional aging, this article proposes **recursive modeling** as an epistemology of selfing. Recursive modeling emerges when development reaches horizons for which no adequate model exists and the individual increasingly becomes both observer and observed within the developmental process. Through recursive examination of assumptions, valuations, and possibilities, selfing progressively relocates the value referent beyond prescribed horizons while remaining open to expanding possibilities beyond the authority of the probable.

The article develops the relationships among recursive modeling, selfing, outliership, horizons of valuation, epistemological complexity, and the inseparability of ontology and epistemology. Centenarians are examined as living evidence of developmental trajectories that exceed culturally prescribed expectations and reveal the limitations of explanations derived primarily from normative averages. It is proposed that recursive modeling provides a developmental account of how individuals participate in the organization of meaning and possibility beyond the constraints of imitation alone.

Keywords

recursive modeling, selfing, self-in-the-world, epistemological complexity, outliership, prescribed horizons, value referents, possibility beyond the probable, exceptional aging, centenarian consciousness, biocognitive epistemology, human flourishing.

Introduction

Observational learning has long occupied an important place in theories of human development. Whether through direct observation of others or through internalized representations of exemplary behavior, modeling has been understood as a primary mechanism by which individuals acquire new patterns of thought and action. Implicit in these approaches is a foundational assumption: that there exists an available model whose observed characteristics can be imitated, internalized, or adapted.

This assumption becomes problematic when examining exceptional human development.

For several decades, my work with centenarians has focused on individuals who age successfully despite conditions that would predict otherwise. These men and women are statistical outliers. Their psychological resilience, physiological adaptability, and capacity to preserve meaning under conditions of adversity often place them outside the expectations established by normative

populations. Yet this observation presents a paradox. If centenarians are outliers, by whom were they modeled?

The question is more than rhetorical. Traditional theories of modeling assume the availability of exemplars. Outliers, however, occupy a position that cannot be explained solely through imitation of the norm. If exceptional outcomes are achieved by individuals who depart significantly from the average, then exclusive reliance upon normative models would be expected to reproduce normative outcomes. The paradox is straightforward: outliers cannot become outliers by exclusively modeling the norm.

This observation suggests a developmental horizon beyond which observational learning becomes insufficient. At that horizon, the individual encounters circumstances for which no adequate model exists. The future being sought has not yet been encountered in a form available for imitation. The challenge is no longer how to model another, but how to proceed when no adequate other can be modeled.

The present article proposes the concept of **recursive modeling** as an epistemology of selfing. Recursive modeling describes a process through which the individual increasingly becomes both observer and observed, engaging in iterative cycles of self-examination, self-correction, and self-authorship. Unlike observational learning, which locates the primary source of development in alterity, recursive modeling progressively relocates the developmental center within the relationship between the present self and the emerging self.

This proposal extends beyond behavior. It rests upon the assumption that ontology and epistemology are inseparable. Every act of knowing is simultaneously an act of becoming. Consequently, recursive modeling is not merely a method of acquiring new behaviors but a mode through which a person participates in the construction of his or her own way of being in the world.

The argument developed here is that recursive modeling becomes increasingly necessary whenever development reaches horizons for which no adequate model exists. Centenarians provide one example of this phenomenon. More broadly, recursive modeling may represent a fundamental process through which exceptional individuals become authors of a life that cannot be achieved through imitation alone.

The Limits of Modeling

A model becomes useful when it offers a possible future that can be approached through imitation. The learner observes a pattern in another and treats that pattern as a provisional guide. In this way, modeling reduces uncertainty by giving form to what has not yet been enacted by the learner.

But the model also carries the limits of the world from which it arises. To imitate a model is not only to acquire a behavior; it is to enter the assumptions, valuations, and possibilities already organized within that model. What is modeled, therefore, is never behavior alone. It is also a horizon of meaning.

This becomes decisive when the desired future exceeds the world that available models can represent. Normative models can guide normative development because they arise from the very order they reproduce. They teach the learner how to enter an existing pattern, refine it, and perhaps perform it well. Yet they cannot fully guide a movement beyond the pattern that makes them intelligible.

The outlier exposes this boundary. An outlier is not merely someone who performs better within the norm. An outlier reveals a trajectory the norm could not adequately predict. For this reason, the outlier cannot be understood only as a more successful imitator. Something in the developmental process has exceeded the epistemology of imitation.

At that point, modeling encounters its limit. The learner may continue to observe others, learn from others, and be shaped by others, but the question changes. The issue is no longer only which model should be followed. The deeper issue becomes how the learner is organizing the meaning of a model, the value assigned to it, and the future it is presumed to make possible.

Here the developmental problem becomes epistemological. The horizon of inquiry begins to turn back upon itself. The person no longer asks only, “Who should I model?” but begins to ask, “What way of knowing has made this model necessary, sufficient, or insufficient?”

This shift marks the limit of conventional modeling and prepares the need for a different epistemology of development.

The Emergence of Recursive Modeling

When conventional modeling reaches its developmental horizon, learning does not cease. What changes is the location from which development is organized.

As long as an adequate model exists, the learner can orient toward alterity. Observation provides direction because the future being sought is already represented in another. The model serves as a bridge between the present condition and a desired possibility. Development proceeds through increasing approximation to an available exemplar.

The situation changes when the future being sought can no longer be adequately represented by existing models. The learner may continue to value the experience, wisdom, and accomplishments of others, yet no available model fully corresponds to the developmental horizon being approached. The problem is no longer how to imitate a model. The problem becomes how to proceed when no adequate model exists.

At this horizon, a different process begins to emerge. Rather than directing attention primarily toward alterity, the individual increasingly turns inquiry toward the relationship between the

present self and the emerging self. Development becomes less dependent upon reproducing an existing pattern and more dependent upon examining, evaluating, and reorganizing one's own way of being.

I propose the term **recursive modeling** to describe this process.

Recursive modeling occurs when the individual progressively becomes both observer and observed within development itself. The person does not abandon learning from others, nor does recursive modeling imply isolation, self-sufficiency, or disengagement from community. Rather, the center of developmental organization gradually shifts. What was once sought primarily through external reference becomes increasingly examined through recursive engagement with one's own assumptions, meanings, valuations, and possibilities.

The significance of this shift lies in the direction of inquiry. Observational modeling asks, implicitly or explicitly, "Who should I become like?" Recursive modeling introduces a different question: "What am I becoming through the way I understand myself, others, and the world?" The inquiry no longer moves only outward toward models. It also moves inward toward the processes through which models are selected, interpreted, and enacted.

In this sense, recursive modeling is not a rejection of modeling but an expansion of its horizons. The developmental challenge is no longer limited to acquiring new patterns of behavior. The individual increasingly participates in the examination of the very processes through which development occurs. The horizon of inquiry that once moved toward the model begins to turn back upon the modeler.

This recursive turn marks the beginning of a selfing path for outliers.

Selfing and the Relocation of the Value Referent

Recursive modeling introduces a shift in the direction of inquiry, but inquiry alone does not explain development. Something within the individual must become the subject of recursive examination.

The question therefore becomes: What is being reorganized through recursive modeling?

The answer proposed here is the value referent.

Human development does not occur in the absence of valuation. Every decision, aspiration, commitment, and interpretation is organized around what is considered meaningful, desirable, worthy, or possible. Whether consciously recognized or not, individuals orient themselves toward value referents that guide perception and action.

In conventional modeling, value referents are frequently located in alterity. The learner identifies qualities in another person and assigns significance to them. What is admired becomes desirable. What is desirable becomes influential. Development proceeds through movement toward values that appear embodied in an external model.

This process is both natural and necessary. No individual develops in isolation. Learning, culture, family, and community all contribute to the formation of value referents. Alterity provides essential horizons through which possibilities first become visible.

Yet recursive modeling gradually introduces a different relationship to valuation.

As the horizon of inquiry turns back upon the modeler, the individual begins to examine not only the model but also the reasons the model is valued. What was previously accepted as meaningful becomes available for reflection. Assumptions can be questioned. Priorities can be reorganized. Possibilities once dismissed can be reconsidered. The person increasingly participates in the formation of the values that organize development.

It is this progressive participation that I refer to as **selfing**.

Selfing is not self-absorption, self-reference, or withdrawal from alterity. Nor is it the assertion of an autonomous self-detached from relationships and community. Rather, selfing describes the progressive organization of one's way of being through recursive engagement with the meanings and values that shape existence.

In this sense, selfing involves a gradual relocation of the value referent. Values that were once accepted primarily through external authority become increasingly examined, affirmed, modified, or transcended through recursive participation. The individual remains influenced by others but is no longer exclusively organized by the valuations of others.

This relocation does not eliminate alterity. It expands the horizon within which alterity is encountered. Others remain important not because they provide fixed templates for development but because they participate in an ongoing dialogue through which meaning continues to evolve.

Recursive modeling describes the epistemology of this process. Selfing describes the developmental path through which it unfolds.

The Admonition of the Norm

The emergence of outliership is rarely met with indifference. As individuals begin to move beyond prescribed horizons of valuation, they often encounter subtle and persistent pressures to return to what is culturally familiar. These pressures are seldom experienced as oppression. More often, they appear as common sense, prudence, realism, modesty, or social responsibility.

Every culture develops mechanisms that preserve continuity. Such mechanisms are essential because they provide stability across generations and help maintain shared meanings. Yet the same mechanisms that preserve continuity may also preserve limitation. Horizons that originated as observations gradually become expectations. Expectations become assumptions. Assumptions become boundaries that are no longer recognized as boundaries.

The admonition of the norm occurs when prevailing valuations are presented not as possibilities among many, but as the limits of what is reasonable to expect from oneself and others. The individual is encouraged to remain within horizons that have already been socially validated. What lies beyond those horizons is often treated with skepticism, caution, or dismissal.

This process is particularly evident when probability is confused with possibility. Statistical patterns are valuable descriptions of populations, but cultures frequently transform such descriptions into prescriptions for individual lives. What is common becomes what is expected. What is expected becomes what is permitted. Over time, descriptive averages acquire the authority of developmental limits.

The consequence is subtle but profound. Individuals may learn to organize their aspirations around inherited expectations rather than around expanding horizons of meaning. Possibilities are not abandoned because they have been disproven. They are abandoned because they have been rendered improbable within the prevailing structure of valuation.

The admonition of the norm is therefore not primarily behavioral. It is epistemological. It shapes what is considered realistic, worthy of pursuit, and even available for consideration. It influences not only what people do, but what they allow themselves to imagine becoming.

From the perspective of recursive modeling, this admonition represents an important developmental challenge. As selfing progresses and value referents become available for recursive examination, inherited limits are no longer accepted automatically. Horizons once experienced as fixed become visible as historical, cultural, and interpretive constructions. What was previously encountered as destiny may now be encountered as valuation.

This does not mean that every inherited horizon should be rejected. Many deserve affirmation. Others deserve refinement. The significance of recursive selfing lies not in opposition to the norm but in the capacity to examine the assumptions through which the norm acquires authority.

Outliers often appear unconventional because they have crossed this threshold. They continue to participate in culture while refusing to organize possibility exclusively around culturally inherited limits. What distinguishes them is not defiance for its own sake, but a willingness to allow horizons of meaning to expand beyond horizons of expectation.

In this sense, outliership begins when possibility is no longer constrained by the authority of the probable.

Possibility Beyond the Probable

Probability and possibility are often treated as though they were interchangeable. They are not.

Probability describes what is likely to occur within a given set of conditions. It reflects patterns, frequencies, and expectations derived from observation. As such, probability provides valuable information about populations, tendencies, and recurring outcomes. It helps individuals navigate uncertainty by identifying what is most likely to happen.

Possibility serves a different function. Possibility concerns what may occur, even when existing patterns provide little reason to expect it. While probability is derived from the past, possibility remains open to futures that have not yet been realized. The two often overlap, but they are not identical.

The distinction becomes important whenever human development approaches the boundaries of prevailing expectations. Within established horizons of valuation, probability often acquires the authority of possibility. What is likely becomes what is believed possible. What is improbable

becomes what is dismissed. Over time, individuals may unconsciously organize their lives around probabilities as though they represented the limits of development itself.

Recursive selfing introduces a different relationship to uncertainty. As prescribed valuations become available for examination, probability remains informative but loses its authority as a final determinant of possibility. The individual continues to recognize patterns and constraints while remaining open to futures not fully contained within them.

This shift should not be confused with wishful thinking, denial, or the rejection of evidence. Possibility is not the refusal to acknowledge probability. Rather, it is the recognition that probability describes tendencies, whereas possibility concerns horizons that may exceed those tendencies.

Outliers often emerge from this distinction. They do not necessarily possess greater certainty than others. They frequently encounter the same probabilities, limitations, and risks as everyone else. What distinguishes them is their refusal to allow the probable to become the sole measure of the possible.

From the perspective of recursive modeling, development expands whenever possibility remains available beyond prevailing expectations. New horizons become visible. New forms of valuation become conceivable. Futures that could not be reached through imitation alone become available for exploration.

The significance of this distinction extends beyond achievement, longevity, creativity, or innovation. It concerns the way individuals relate to their own futures. A life organized exclusively by probability remains confined to what has already been demonstrated. A life organized by possibility remains open to what has not yet been fully imagined.

In this sense, recursive selfing preserves a horizon beyond the probable.

Epistemological Complexity and Recursive Depth

Recursive modeling does not occur simply because an individual encounters uncertainty, adversity, or possibility. Many people encounter such conditions without significantly altering the way they organize meaning. The question therefore arises: What allows some individuals to sustain recursive selfing beyond prescribed horizons while others remain primarily organized by them?

This difference becomes more intelligible when examined through the lens of epistemological complexity.

Epistemological complexity concerns the capacity to examine not only what is known, but also how knowing is being organized. As epistemological complexity expands, inquiry becomes increasingly recursive. Questions that were once directed exclusively toward the world begin to include the assumptions, valuations, and interpretive processes through which the world is understood.

At lower levels of recursive depth, development remains largely organized by prescribed models, prescribed valuations, and prescribed expectations. Such organization is neither deficient nor pathological. It reflects the necessary role that existing structures play in reducing uncertainty and providing continuity. Most human learning begins within these horizons.

As recursive depth increases, however, the individual becomes progressively capable of examining the horizons themselves. What was once accepted as given becomes available for inquiry. Prescribed valuations become subjects of reflection rather than automatic guides for development. The individual does not merely acquire new knowledge; the organization of knowing itself becomes available for examination.

This distinction is important because knowledge and epistemological complexity are not synonymous. Knowledge may accumulate without substantially altering the horizons through

which reality is interpreted. Epistemological complexity expands when inquiry becomes increasingly capable of examining its own assumptions, limits, and organizing principles.

From the perspective of recursive modeling, increasing epistemological complexity permits greater freedom in the organization of possibility. Horizons that previously appeared fixed become available for reconsideration. Questions once regarded as settled become open to renewed inquiry. Possibilities once dismissed as improbable become available for examination without requiring their immediate acceptance.

This recursive depth does not eliminate uncertainty. It increases one's capacity to engage uncertainty without prematurely closing inquiry. The individual becomes progressively less dependent upon prescribed horizons as the sole source of orientation and increasingly capable of participating in the organization of meaning itself.

In this sense, epistemological complexity provides the recursive depth through which selfing can continue to unfold. As horizons of inquiry expand, new possibilities become available, not because reality has changed, but because the horizon through which reality is interpreted has expanded.

Centenarians Beyond Prescribed Horizons

The concepts developed thus far did not arise in abstraction. They emerged from a recurring observation encountered throughout the study of exceptional aging. Again and again, centenarians appeared to organize their lives in ways that could not be adequately explained by prevailing expectations regarding age, limitation, and possibility.

Genetics undoubtedly contributes to longevity. It is a constituent of exceptional aging and should not be dismissed. Yet a constituent is not a sufficient explanation. The tendency to elevate genetic contribution into a comprehensive account of longevity often obscures a more fundamental

question: How do individuals organize their lives in ways that permit possibilities extending beyond what prevailing expectations would predict?

This question becomes particularly important when considering the role of actuarial tables and life-expectancy models. Such tools provide valuable descriptions of populations. They identify patterns, averages, and probabilities that assist in understanding large groups of people. Their usefulness, however, is often accompanied by an unintended consequence. Descriptions of populations gradually become prescriptions for individuals.

What begins as statistical observation may become a horizon of valuation. Expectations regarding age become expectations regarding possibility. Probability acquires the authority of destiny. Individuals learn to organize their futures around what is expected to occur rather than around what remains possible.

Centenarians repeatedly challenge this transformation.

The challenge does not arise because they deny biological reality, reject probability, or ignore limitation. Rather, they appear less willing to organize possibility exclusively around such considerations. The actuarial horizon that functions as a developmental boundary for many individuals often functions merely as information for them. Probability remains informative, but it does not become sovereign.

This distinction reveals an important epistemological limitation. Population averages are most informative near the center of a distribution. Yet centenarians reside at the far horizon of that distribution. The farther one moves toward the edge of the curve, the less adequately the average explains the phenomenon being observed. The average explains the center of the curve; the outlier reveals its horizon.

What repeatedly emerged in the lives of centenarians was not merely an unusual collection of health behaviors, favorable genes, or fortunate circumstances. More striking was their relationship to possibility. They often continued to envision futures, commitments, projects, relationships, and contributions beyond horizons that others regarded as reasonable. Their lives appeared organized less by prescribed expectations and more by expanding horizons of meaning.

From the perspective of recursive modeling, this observation acquires additional significance. Centenarians may be understood as living evidence of what becomes possible when selfing continues beyond prescribed horizons of valuation. Their longevity is not explained solely by the refusal of limitation, but neither can it be fully understood without examining the ways in which possibility remained available beyond probability.

The significance of this observation extends beyond aging. The centenarian reveals a principle applicable to human development more broadly. When prescribed horizons become confused with actual limits, possibility contracts. When horizons remain available for recursive examination, development may proceed in directions that prevailing expectations could not have predicted.

In this sense, centenarians are not merely exceptions to a rule. They are evidence that the rule itself may be epistemologically incomplete.

Conclusion

This article began with a simple question: If exceptional development is achieved by outliers, who do outliers model?

The question emerged from observations of centenarians whose lives repeatedly exceeded expectations derived from prevailing norms, actuarial predictions, and culturally prescribed horizons of possibility. What initially appeared to be a question about longevity gradually revealed a more fundamental inquiry regarding human development itself.

Conventional models of learning assume that development proceeds through reference to available exemplars. Such models remain indispensable because they provide access to possibilities not yet enacted by the learner. Yet outliers expose a developmental horizon beyond which imitation becomes insufficient. When the future being sought cannot be adequately represented by existing models, development can no longer depend exclusively upon alterity.

At this horizon, recursive modeling emerges.

Recursive modeling is the epistemology through which the individual increasingly becomes both observer and observed within development itself. Through recursive examination of assumptions, valuations, and possibilities, the person begins to participate in the organization of meaning rather than relying exclusively upon prescribed models and prescribed horizons.

This process was described as selfing.

Selfing does not signify withdrawal from alterity, autonomy from community, or self-reference detached from the world. Rather, it describes the progressive organization of one's way of being through recursive participation in the meanings and valuations that shape existence. As selfing unfolds, the value referent becomes increasingly available for examination, allowing possibility to remain open beyond the authority of the probable.

From this perspective, outliers are not simply individuals who achieve uncommon outcomes. They reveal developmental trajectories that exceed prescribed horizons of valuation. Their significance lies not merely in what they accomplish, but in what they disclose about the relationship between possibility, meaning, and human development.

Centenarians provide living evidence of this process. Their lives suggest that exceptional aging cannot be understood solely through biological constituents, statistical averages, or actuarial expectations. Such factors remain important, yet they are insufficient to explain how individuals

continue to organize possibility, purpose, contribution, and meaning beyond horizons that others regard as definitive. In doing so, they expose the epistemological limitations of explanations derived primarily from the center of a distribution and invite inquiry into the horizons that averages cannot adequately explain.

The developmental significance of recursive modeling extends beyond longevity. It concerns the capacity of human beings to examine the assumptions through which reality becomes meaningful. As epistemological complexity expands, inquiry becomes increasingly capable of examining not only what is known, but the horizons through which knowing occurs.

At its deepest horizon, recursive inquiry reveals that ontology and epistemology cannot be fully separated. Every ontological claim presupposes a way of knowing, and every way of knowing presupposes an existent who is knowing. The question therefore shifts from what exists and how it is known to a more fundamental inquiry: Who is existing the asking?

The answer proposed here is neither the isolated self nor alterity alone, but the self-in-the-world as recursive existent. It is through this recursive existent that meaning becomes available, horizons expand, valuation is reorganized, and development continues beyond prescribed limits. What begins as modeling ultimately becomes selfing. What begins as imitation becomes participation in the ongoing organization of meaning.

In this sense, recursive modeling is not merely a theory of outliers. It is a developmental account of how human beings become available to themselves as participants in their own becoming.

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