

Premature baby and nonverbal behavior interpretation



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Understanding Preterm Infant Behavior in the NICU

- All living things are in constant communication with their environment.
- The trick is learning how to understand their method of communication.
- Heidi Als, Ph.D. has been a pioneer in helping us understand how to "read" preterm infant's cues, especially while they are still in the NICU

The Synactive Theory of Infant Development

- The Synactive Theory of Infant Development provides a framework for understanding the behavior of premature infants



According to the Synactive Theory:

- What is organized behavior?
 - What is disorganized behavior?

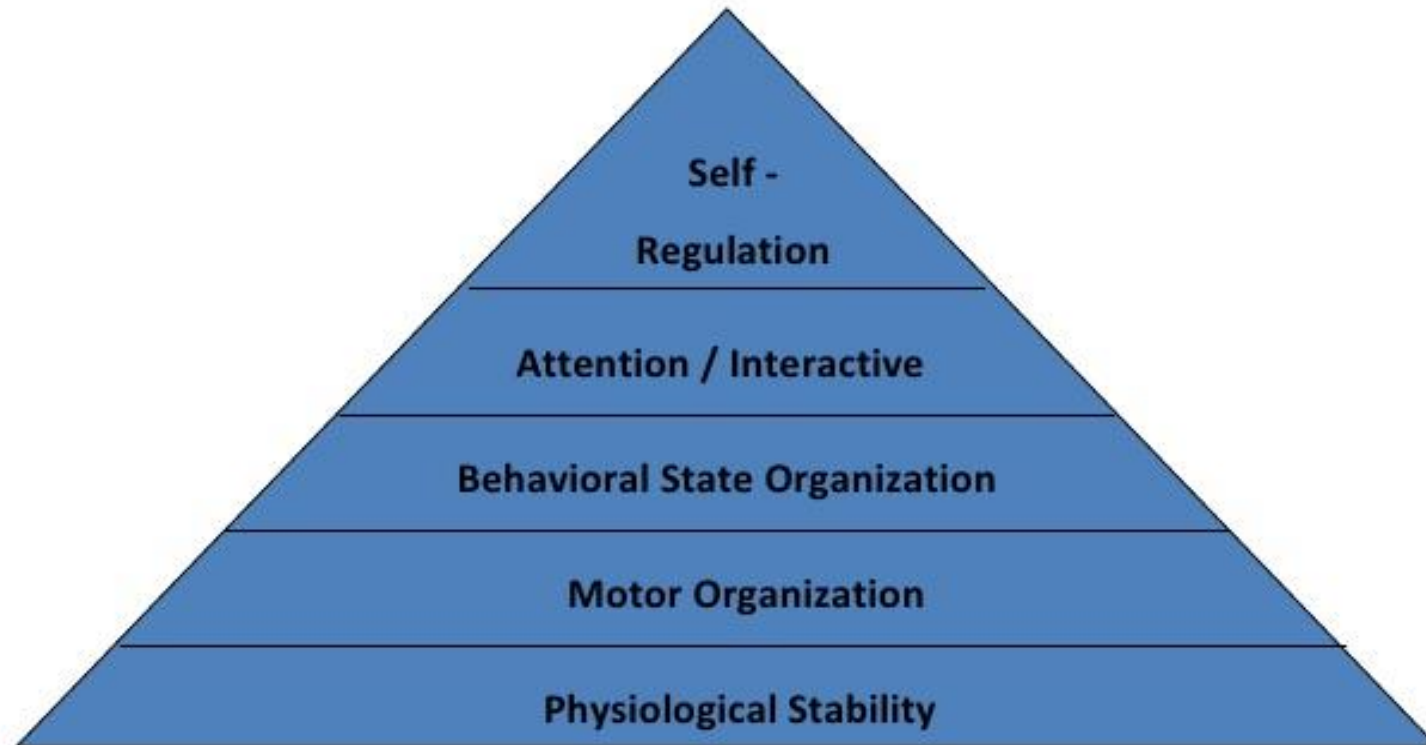
The Synactive Theory of Infant Development

- **MOTOR** - We look at the infant's motor tone, movement, activity and posture.
- **AUTONOMIC** - This is the basic physiologic functioning of our body necessary for survival. The easily observable indicators of this subsystem are skin color, tremors/startles, heart rate and respiratory rate.
- **STATES** - This is a way of categorizing our level of central nervous system arousal - sleepy/drowsy, awake/alert and fussing/crying.
- **ATTENTION/INTERACTION** - This is the availability of the infant for interacting, alertness and the robustness of the interaction.
- **SELF-REGULATORY** - This is the presence and success of the infant's efforts to achieve and maintain a balance of the other four subsystems.
- <https://med.emory.edu/departments/pediatrics/divisions/neonatology/dpc/nicubeh.html>



Synactive Theory of Infant Development

Heidelise Als



Hierarchical interaction and interdependency of five subsystems

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The infant's response to the environment is our only insight to whether the environment is appropriate and supportive for the infant.

The Synactive Theory of Infant Development

- The process of subsystem interaction (how the five subsystems work together or influence each other) is what is meant by the term "synaction."
- This synaction is combined with the infant's continuous interaction with the environment to formulate the "Synactive Theory of Infant Development."(1)
- The development of one subsystem is dependent on the stability and the emergence of one of the others; all are interdependent and interrelated(2)

Full term versus preterm

- **In healthy full term infants** these systems generally work smoothly supporting and promoting each other.
- **In the preterm infant** these systems are not fully developed and ready to function.
- Therefore, the **preterm infant's behaviors** are generally characterized by disorganization and signs of stress.
- **The preterm infant is more dependent, than the full term infant, on its environment to help support and maintain balanced equilibrium.**
- <https://nidcap.org/wp-content/uploads/2013/12/APIB-Chapter.pdf>

Modern Units

- **Technology, which focuses care solely on the autonomic system (respiratory, cardiac, digestive and temperature control functions), comes at the expense of the motor, state, organizational and self-regulatory systems, which are intimately dependent on an adaptive environment**
- Newborn Individualized Developmental Care and Assessment Program (NIDCAP): New frontier for neonatal and perinatal medicine. December 2008, Journal of Neonatal-Perinatal Medicine 2(3):135-147. DOI: [10.3233/NPM-2009-0061](https://doi.org/10.3233/NPM-2009-0061)

Autonomic Signs of Stress

- Color changes (pallor, flushing (turning red), and cyanosis (turning blue))
- Changes in vital signs (heart rate, respiratory rate, blood pressure (BP), pulse ox rate)
- Visceral responses (vomiting, gagging, hiccups, passing gas)
Sneezing
Yawning
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1249525/>

Motor Signs of Stress

- **Generalized hypotonia (limp, decreased resistance to moving of the infant's extremities)**
- **Frantic flailing movements**
- **Finger splaying (holding fingers spread wide apart)**
- **Hyperextension of extremities (arms or legs extended straight out almost in a locked position)**

State Signs of Stress

- **Diffuse sleep states (lots of twitching, grimacing, not resting peacefully)**
- **Glassy-eyed (appears to be "tuning out")**
- **Gaze aversion (cuts eyes to the side trying not to look at what is in front of them)**
- **Staring (a locked gaze, usually wide open eyes)**
- **Panicked look**
- **Irritability (hard to console)**

Attention/Interaction Signs of Stress

- Infant will demonstrate stress signals of the autonomic, motor and state systems
- Inability to integrate with other sensory input (can't look and face, listen to talking and suck a bottle at the same time)

<https://med.emory.edu/departments/pediatrics/divisions/neonatology/dpc/nicubeh.html>

Motor system

Organized behavior

- Smooth and modulated posture
- Efficient movement strategies like (Hand on face , hand clasp, food clasp , finger folding , sucking, grasping)

Disorganized behavior

- Hyper tonicity, Hyperextension, protective maneuver like covering face by bringing hand in front of face, salute, fisting,
- Flaccidity(Hypotonic)
- Diffuse activity
- Unstable tone



Autonomic System

○ Organized

- Even Respiration
- Good, Stable Color
- Stable Digestion

○ Disorganized

- Respiratory Pauses
- Tachypnea
- Grunting
- Breath holding
- Gagging/gasping
- Color changes
- Spitting up
- Hiccupping
- Sighing
- Yawning
- Straining
- Tremoring
- Startling
- Twitching
- Coughing
- Sneezing



State System

- **Organized**
 - Clear robust sleep state
 - Rhythmical/robust crying
 - Good self quieting and consolability
 - Robust/focused/shiny eyed alertness
 - Animated facial expression
 - Frowning, cheek softening/ooh face, cooing, attentional smiling
- **Disorganized**
 - Diffuse sleep/awake states
 - Whimpering sounds
 - Facial twitches and discharge smiling
 - Eye floating
 - Strained or fussy crying
 - Staring
 - Active averting
 - Panicked or worried alertness
 - Glassy-eyed or low key alertness
 - Rapid state oscillations
 - Irritability



Behaviors of Premature Infants in a NICU

- Approach/Groping behavior
 - when stimulation is within the infant's ability to organize
- Avoidance/Withdrawal behavior
 - When stimulation is beyond the infant's level of organizational function
 - Observed as stressor
- These behaviors are a response to the appropriateness of the stimulation

Listen, Look, Learn

Some avoidance cues :

- include yawning,
- hiccups,
- sneezing,
- facial grimacing
- squirming movements
- the 'salute' (fingers over face),
- looking away,
- jerky movements,
- finger splaying,
- tremors
- clenched fists

positive 'coping' cues or behaviors

- Hand to mouth,
- hands together, sucking,
- smooth movements (as opposed to jerky) and
- grasping/holding.

- **These are examples of inborn behavioral patterns that help your baby to stay calm, pay attention and remain controlled.**

http://www.infantjournal.co.uk/pdf/inf_006_irs.pdf

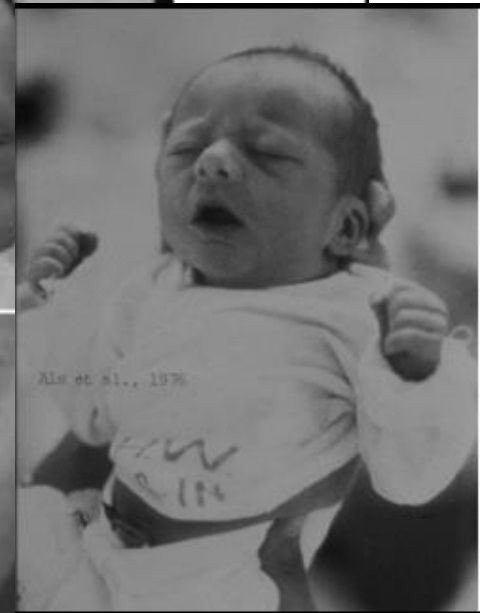
Preterm vs. Full Term Infant



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Regulatory System

Efforts
Strategies
Success



Prematurely Yours (H. Als) 1984

H. Als, 2013

I need a short break, I am worried, I need something to brace my feet on, or I am uncomfortable

- That little yawn, suddenly opened hand, frown, leg extension, or grimace.
- To an astute neonatal intensive care nurse, these are all subtle communications from their tiniest patients that may mean I need a short break, I am worried, I need something to brace my feet on, or I am uncomfortable

Tell us about your impression from this picture



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What does it mean to you???



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What does it mean



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Sit on air/ Airplane



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Sit on air



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Ways to Assist with Self Regulation

- Talk to infant first before handling
- Give breaks between changes in position
- Talk softly
- Only present one stimulus at a time
- Provide boundaries
- Containment
- Grasping
- Bring hands to face/midline
- Assist in maintaining flexion
- Use constant firm touch; not light fast touch

Finger Splay



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Open face ready to communicate



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Hand to mouth



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Tell us about this picture



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Compare two positions



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What is his message to you???



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Self regulation



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What do you understand from this newborn's cues



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What does the baby tries to tell you



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Close hands

Motor System

Tone

Posture

Movement



Prematurely Yours (H. Als) 1984

H. Als, 2013

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What do you see???



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How do you interpret this behavior



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Avert and foot on air + hand on face and Gape



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Too much light for me, however, I try
to self regulate



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What do you see???



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How do you interpret this behavior?



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I need my mom breast or ...



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I feel pain



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How to co regulate? When to co regulate? Why to co regulate?

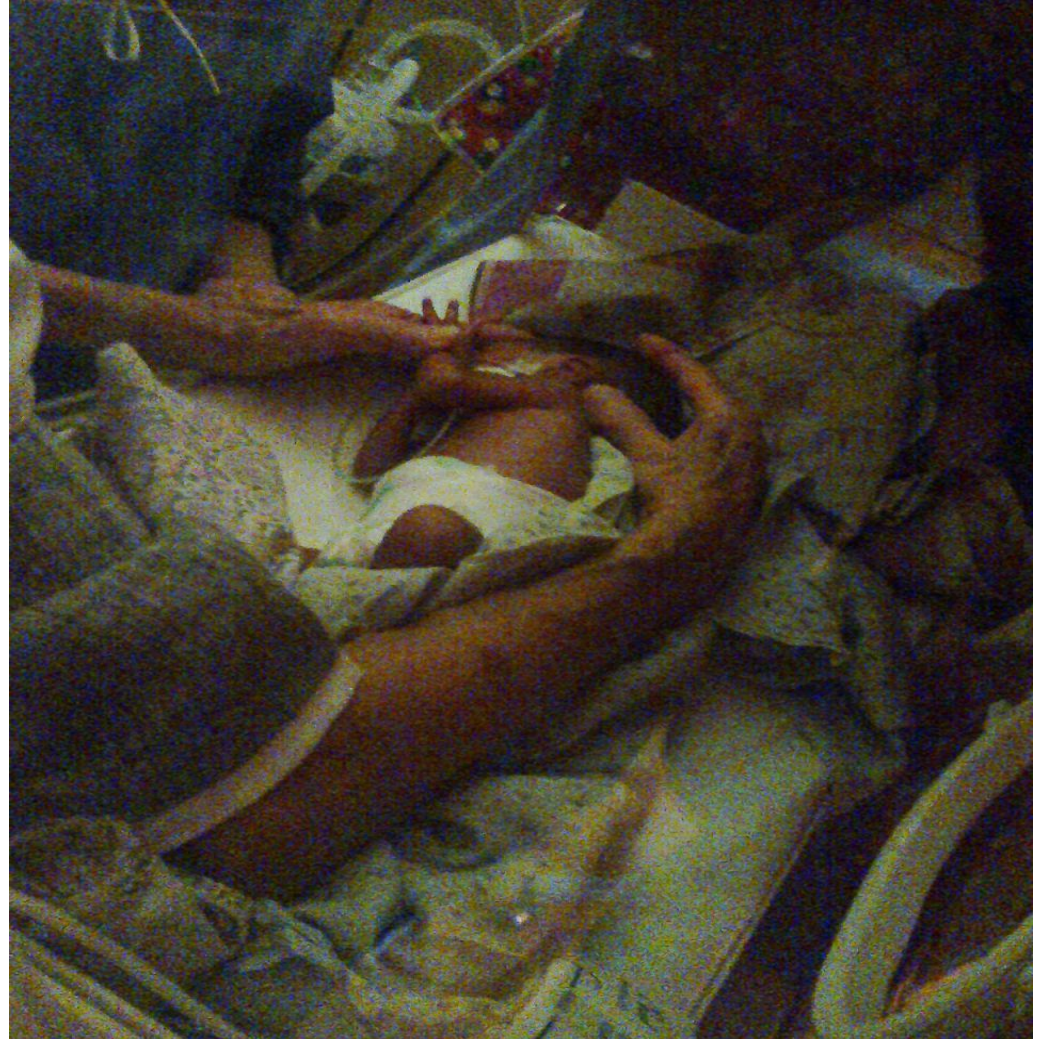


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Co regulation



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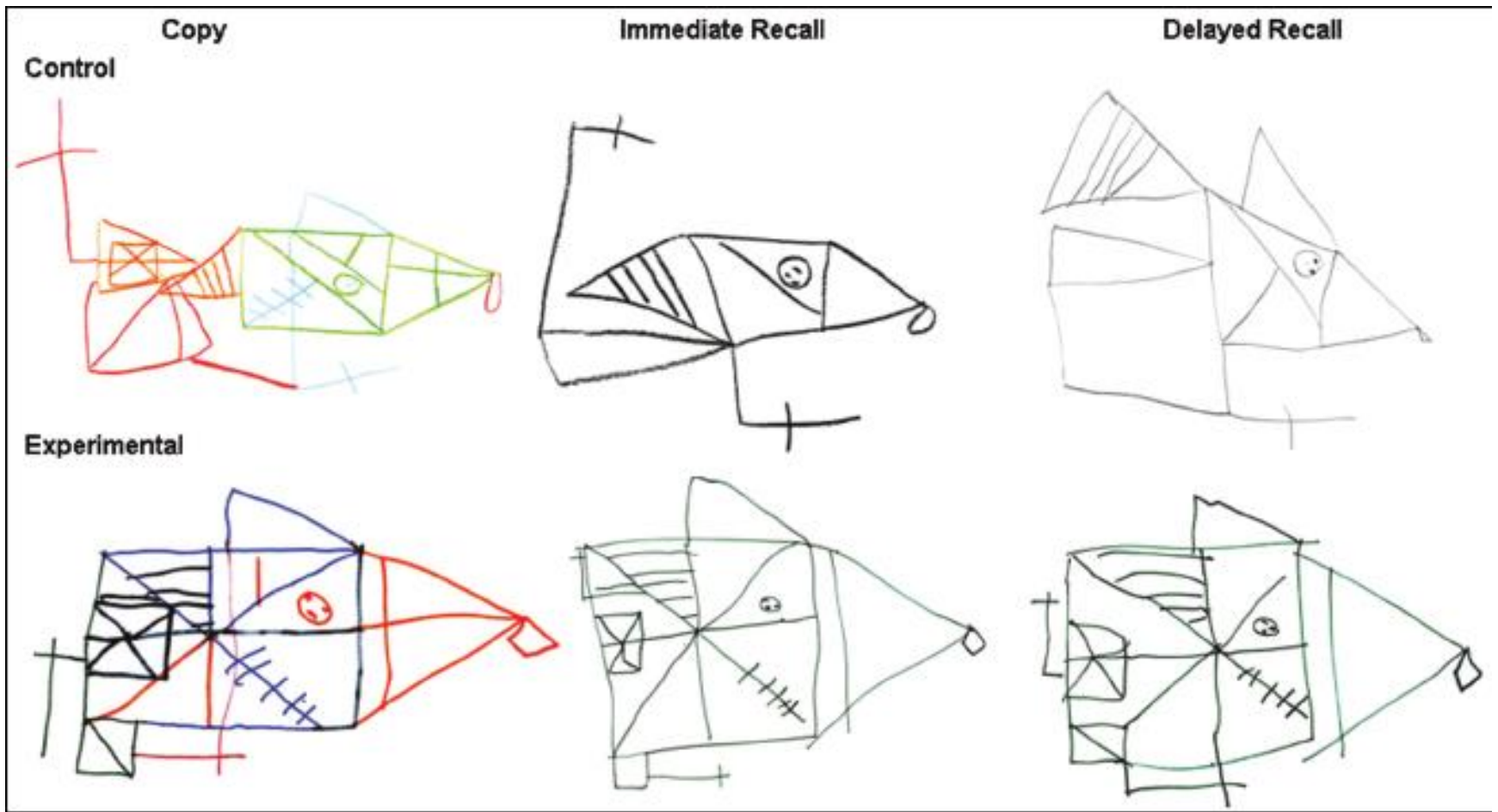
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Strategies for dealing with "State Signs of Stress"

- Grouping care activities - This should enable infants to have longer periods of quiet. Hopefully increased rest will optimize an infant's growth and development.
- Appropriate Timing of Care - As much as is possible in an intensive care unit organize the infant's daily routine to his "best times."
- " Individualize care to the capabilities and needs of each infant. Some interventions may be helpful to one infant and stressful to another, and sometimes be helpful or stressful to the same infant at different times.

Strategies for dealing with "State Signs of Stress"(cont....)

- Use swaddling,
- prone or side lying supported positioning to help a infant with state control.
- Look at and listen to the infant's immediate environment from his/her point of view.
- Particularly, look at the appropriateness and quantity of stuffed animals and pictures in the infant's immediate environment and adjust them to aid in state maintenance and smooth transitions.
- The baby needs to be able to look at things if he/she chooses, but also be able to look away easily if it becomes stressful.



Rey-Osterrieth complex figure. The figure represents sample drawings from 2 study children, 1 from the Control group, a 9 year 3 month old born at 31 w 1 d GA; and 1 from the Experimental group, a 8 year 4 month old born at 31 w 4 d GA. The conditions displayed are from left to right: Copy, Immediate Recall, and Delayed Recall



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