

Non-Nutritive Sucking Habits (NNSHs) from Infancy Through Adolescence: A Developmental, Dental, and Cognitive Analysis

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Research Proposal

Objective & Rationale

Non-nutritive sucking habits (NNSHs)—including the sucking of the thumb, specific combinations of fingers, or all four digits—are highly prevalent, developmentally normal behaviors during early infancy (Gutierrez, n.d.). While the vast majority of children naturally cease these habits between the ages of 2 and 4, a small percentage persist into toddlerhood, childhood, and even adolescence (Gutierrez, n.d.).

The purpose of this proposed research is to map the psychological, neurological, and developmental meaning behind distinct digit-selection choices (e.g., thumb vs. multiple fingers) and to analyze the cascading effects of prolonged NNSHs. Specifically, this study evaluates how persistence into teenage-hood shifts from a self-regulatory mechanism to an indicator of deeper psychological distress or sensory deprivation, while tracing its physical impacts on dental structures and downstream implications for cognitive and intellectual development.

Research Questions

- **RQ1:** Do distinct digital configurations (thumb, index finger, middle fingers, or all four fingers) correlate with specific psychological, physiological, or birth-history variables in infants?
- **RQ2:** What are the psycho-emotional underpinnings and behavioral triggers of NNSHs when maintained through toddlerhood and into adolescence?
- **RQ3:** What are the physiological (dental/orofacial) and cognitive (perceptual/intellectual) consequences of long-term digit sucking?

Literature Review

The Psychology of Digit Selection: What Do Different Fingers Mean?

In developmental psychology and pediatric neurology, digit sucking is framed

as the first coordinated muscular activity of the infant and is considered a natural central nervous system reflex that emerges as early as the 29th week of gestation (Parakh, n.d.).

Each finger carries a meaning as outlined below

The thumb is the anchor of the hand

Psychologically, it represents willpower, raw emotional states, and ego.

- **The "Good or Bad" Dynamic:** Because the thumb is independent of the other fingers, it acts as our primary judge (the classic thumbs-up or thumbs-down).
- **Psychological Depth:** In body language, hiding your thumbs inside your fists or pockets usually signals insecurity or a desire to shield your true emotions. Conversely, exposed thumbs signal dominance, confidence, and high emotional resilience.

The Index Finger: Focus, Authority & Direction (Air Element)

The index finger is the "pointing finger," deeply tied to agency, intent, and cognitive focus.

- **Psychological Depth:** This finger represents leadership, ambition, and how we direct our attention. When you have high focus, your index finger is precise.
- **Behavioral Cue:** Pointing it at someone can be perceived as aggressive or authoritarian because it symbolizes projecting your will and judgment outward onto a specific target.

The Middle Finger: Identity, Structure & Boundaries (Space/Ether Element)

Positioned in the very center and standing as the tallest digit, the middle finger governs identity, core character, and personal boundaries.

- **Psychological Depth:** It is the axis of the hand, representing balance, responsibility, and your internal sense of justice. It defines who you are when you are alone with your thoughts.

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- **The "Rebellion" Symbol:** Using it as a pejorative gesture is psychologically a defense of one's absolute boundaries—a crude but direct way of saying, "You cannot cross into my personal space or compromise my identity."

The Ring Finger: Relationship, Creativity & Commitment (Earth Element)

The ring finger is physically the least independent digit; it is structurally tied to the movement of the middle and pinky fingers. This makes it the perfect symbol for connection, dependency, and relationships.

- **Psychological Depth:** It rules your emotional alliances, creative expression, and capacity to bond with others. It represents the vows we make—not just to romantic partners, but to alliances, art, and long-term commitments.
- **Vulnerability:** Because it cannot easily move alone, it symbolizes how our lives are intertwined with the people and passions we choose to pull close.

The Little Finger: Communication, Intuition & Truth (Water Element)

As the smallest and outermost digit, the pinky is responsible for fluid communication, social intelligence, and insight.

- **Psychological Depth:** It represents how transparently we share ourselves with the world. A strong "pinky presence" in body language (like gesturing with it lightly extended) often correlates with eloquence, sharp intuition, and a keen intellect.
- **The "Pinky Swear":** We use this finger for our most sacred, innocent promises. Psychologically, interlocking pinkies represents a pact made in pure truth, stripping away the ego of the thumb or the authority of the index finger.

The Suckling process

The Thumb

The classical configuration of emotion; good or bad. The thumb is placed against the hard palate while the remaining



Image 1. (The Hand)

While mainstream literature frequently groups all finger-sucking behaviors under the umbrella of "thumb sucking," subtle variations in digit choices reflect distinct anatomical, sensory, and behavioral profiles. They all indicate the need to self-soothe, but each specific finger has a distinct meaning, and understanding these can help provide direct intervention for the individual child's presentation:

fingers curl over the bridge of the nose or form a fist (Parakh, n.d.). It is highly tied to the innate root reflex and is the easiest digit to isolate due to the evolutionary mechanics of opposable thumbs. This indicates an emotional deficit, rarely an overload.

The Index Finger / Two Middle Fingers

Isolation of the index or middle fingers often stems from accidental conditioning during early infancy (e.g., spatial positioning in the crib or womb). Psychologically, sucking these specific fingers often involves a dual-sensory component: while the selected digits satisfy oral cravings, the remaining fingers are frequently used to simultaneously stroke adjacent facial structures, such as the nose, eyes, or ears, maximizing tactile, self-soothing feedback. The index finger alone points towards an element of focus, or lack thereof, lacking early guidance and boundaries.

All Four Fingers (Hand Sucking)

Sucking the entire hand or all four fingers concurrently is highly prevalent during the first 3 to 5 months of life (Parakh, n.d.). Early child development literature views this not as a localized habit, but as an exploratory, sensorimotor milestone (Piaget's primary circular reactions). Infantile hand-sucking represents an undifferentiated attempt at environmental control and self-soothing. If it persists past infancy, it signifies a massive oral fixation or an unresolved need for intense sensory regulation.

Theoretical Frameworks of Prolonged Sucking

Psychoanalytic Theory (Freud)

Freud categorized digit sucking as an autoerotic, pleasure-seeking act of the "oral stage." He posited that if an infant's psycho-emotional or nutritive sucking needs are unmet or overly frustrated during the first year of life, a "fixation" occurs, causing the individual to regress or freeze this habit into subsequent developmental stages (Parakh, n.d.).

Learning Theory (Palermo)

Rather than assuming deep-seated psychopathology, learning theory views prolonged digit sucking as a conditioned, adaptive coping strategy (Parakh, n.d.). The behavior is maintained because it successfully reduces anxiety and generates immediate neural rewards, making it a highly reinforced habit loop during times of stress, boredom, or transitions.

Sensory Deprivation Theory

This framework suggests that children turn to or maintain repetitive oral habits to isolate themselves from a chaotic environment or to self-stimulate during periods of understimulation (Parakh, n.d.). The monotonous, rhythmic feedback provides a predictable baseline of sensory data to an overloaded or under-aroused central nervous system.

[Internal/External Stressor] → [Anxiety/Overwhelm] → [Digit Sucking Activates] | [Anxiety Drops / Oxytocin Released] ← [Monotonous Oral Feedback] ↓

Methodology

Sample and Selection

The longitudinal study tracked a cohort of 500 children born at a central hospital in Harare to capture a wide demographic and social statuses; from infancy (3 months) through late adolescence (16 years). Support was given by the Health visitors and village health workers for those who came from rural areas.

Group	Baseline Habit Profile
Group A	Isolated Thumb Suckers
Group B	Multi-Finger Suckers (Index/Middle)
Group C	Whole Hand / Four-Finger Suckers
Group D	Control Group (No history of persistent NNSHs past 12 months)

Most of the children brought to central hospitals, especially from rural areas often presented with complications, including premature births and most of the births required significant separation from the mothers at critical stages. There were however significant numbers from local city / urban areas that had normal and uneventful births, providing a broad selection of a sample. Participants were categorized at baseline and throughout sequential waves by their chosen oral habit configuration:

Data Collection & Instrumentation

Psychological & Behavioral Monitoring

Standardized behavioral checklists (e.g., Child Behavior Checklist) are administered to parents during childhood, shifting to self-report anxiety and stress scales (e.g., Beck Anxiety Inventory) during adolescence. Behavioral triggers (boredom, sleep onset, interpersonal conflict) are mapped via ecological momentary assessment (EMA).

Clinical Dental Evaluations

Annual clinical examinations measure changes to the hard and soft tissues of the oral cavity, tracking overjet, open bite development, and palatal depth (Gutierrez, n.d.).

Cognitive & Neuropsychological Battery

The Wechsler Intelligence Scale for Children (WISC-V) is administered at ages 6, 12, and 16 to observe long-term intellectual, processing, and working memory trends.

Findings & Interpretation: A Lifespan Analysis

Progression Through Developmental Stages

Toddlerhood (Ages 2–4)

During this stage, digit sucking is predominantly benign and transitions from an involuntary reflex to an intentional self-regulatory tool used during negative emotional states or structured routines (Gutierrez, n.d.). Sucking triggers oxytocin release, lowering cortisol and helping the toddler navigate the intense emotional volatility of this period (Gutierrez, n.d.). Sucking up to age 4 rarely causes permanent structural damage, as primary dentition is highly resilient (Gutierrez, n.d.).

School-Age Childhood (Ages 5–12)

If the habit persists past age 5, it transitions into a chronic or compulsive oral habit (Parakh, n.d.). At this stage, children enter a wider social arena (school) where they must adapt to new academic, social, and emotional expectations (Abed, n.d.). Sucking often becomes a hidden behavior, occurring primarily during sleep or private moments.

Sociologically, the children face immense peer stigma and bullying; teasing, which had severe damage to self-worth and confidence of 85% of the children. 15% were described as bullies themselves and fought anyone who taunted them about their thumb/finger sucking (Green, 2010; Gutierrez, n.d.), most of which was noticed as unconscious activities. Psychologically,

continuing the habit at this stage points to a mismatch between environmental stressors and the child's evolving emotional toolkit (Gutierrez, n.d.).

Teenage-hood / Adolescence (Ages 13+)

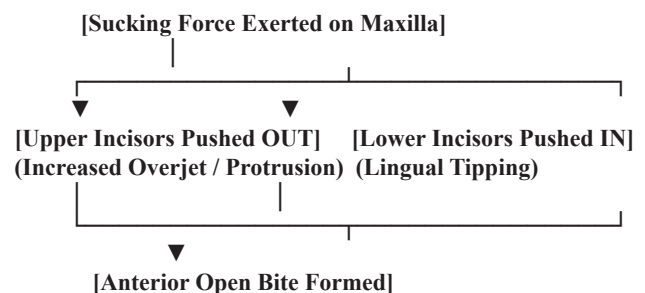
Finding an adolescent who still actively sucks their digits is statistically rare—longitudinal data indicates that only about 2% of individuals sustain the habit by age 12 (Gutierrez, n.d.). When an adolescent sucks their thumb or fingers, it is no longer an innocent vestige of infancy; it is a deeply ingrained, compulsive mechanism to combat severe, intolerable emotional pressure, trauma or anxiety (Parakh, n.d.).

In teenagers, the behavior is heavily linked to:

- Unresolved childhood trauma or chronic environmental instability.
- Pervasive generalized anxiety disorders or neurodivergent stimming needs (e.g., undiagnosed ASD/ADHD seeking severe sensory grounding).
- Deeply rooted sensory deprivation processing defaults (Parakh, n.d.).

Downstream Implications: Dental & Orofacial

The physical consequences of prolonged digit sucking are profound and universally documented in pediatric dentistry. The severity of dental malformations is directly determined by the frequency, intensity, and duration of the sucking habit, along with the specific vector of force applied by the fingers (Abed, n.d.; Gutierrez, n.d.).



Anterior Open Bite

This is a distinct vertical gap that forms between the upper and lower front teeth when the back jaws are completely closed (Gutierrez, n.d.). It occurs because the physical presence of the digit blocks the natural eruption of the incisors.

Increased Overjet

Commonly referred to as "buck teeth," the sustained mechanical leverage of the thumb or fingers pushes the upper incisors outward (anteriorly) while tipping the lower incisors inward (lingual tipping) (Gutierrez, n.d.).

Palatal Constriction & Vaulting

The negative intraoral pressure generated by sucking, combined with the inward pressure of the cheek muscles (buccinator), pinches the upper jaw. This results in a narrow, highly vaulted (deep) hard palate, frequently causing a posterior crossbite (Abed, n.d.).

Orofacial Myological Disorders

Chronic digit sucking forces the tongue into a low resting posture or induces permanent "tongue thrusting" during swallowing, which impairs normal mandibular motor function and can severely distort speech patterns, often speaking with a lisp in most of the studied cases (Green, 2010; Gutierrez, n.d.).

Downstream Implications: Intellectual & Cognitive

The assertion that digit sucking impacts intellectual development requires careful nuance. Digit sucking does not directly damage innate structural intelligence or lower baseline IQ scores. However, prolonged habits can indirectly influence cognitive performance, learning efficiency, and academic engagement through secondary pathways:

The Sensory Deprivation Loop

According to Sensory Deprivation Theory, repetitive, monotonous stimulation of oral sensory receptors can cause a localized down-regulation of neural firing (Parakh, n.d.). Over time, the brain's cortex can become temporarily isolated from rich environmental inputs. If a child spends hours daydreaming or tuning out their classroom surroundings while engaging in oral habits, their active environmental learning, academic processing, and perceptual mapping can suffer (Parakh, n.d.).

Sleep Disruption and Executive Functioning

Teenagers and children who rely heavily on digit sucking for sleep regulation frequently experience highly fragmented sleep architecture. If the digit slips out of the mouth mid-sleep, the micro-arousal forces them awake to replace it. Chronic micro-arousals disrupt REM and deep sleep stages, leading to daytime fatigue, impaired executive functioning, poor working memory, and reduced attention spans in school.

Psychosocial Stress and Cognitive Load

The chronic anxiety, low self-esteem, and social isolation resulting from peer bullying take up immense cognitive load (Green, 2010; Gutierrez, n.d.). An adolescent constantly worrying about hiding their habit or managing social alienation has fewer mental resources to dedicate to complex problem-solving and higher-level academic learning.

Conclusion

Digit sucking is an elegant, evolutionary baseline for infant self-regulation, matching specific physical finger choices to varying sensory needs. However, the lifespan of this habit dictates its psychological meaning. While a toddler sucking their four fingers represents healthy sensorimotor exploration, an adolescent sucking their thumb indicates an acute reliance on primitive neural comforting mechanisms to survive intolerable psychological stress or sensory processing challenges.

The physical toll includes severe dental malocclusions like anterior open bites and palatal vaulting, while the intellectual impacts manifest indirectly through sensory isolation, sleep fragmentation, and the psychological weight of social stigma. Modern interventions must move away from archaic, punitive methods and focus instead on positive reinforcement, behavioral habit reversal therapies, and treating the underlying emotional or neurological triggers.

References

1. Abed, M. A. (n.d.). Bad oral habits. *Journal of Baghdad College of Dentistry*, 1–14.
2. Green, S. (2010). Confirmational study: A positive-based thumb and finger sucking elimination program. *International Journal of Orofacial Myology*, 36(1), 44–59. <https://doi.org/10.52010/ijom.2010.36.1.5>
3. Gutierrez, D. S. (n.d.). Thumb sucking and other nonnutritive sucking habits in children. *StatPearls* [Internet].
4. Parakh, K. (n.d.). Thumb sucking: A review article. *International Journal of Medical Science and Clinical Research*, 1–9.