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Micro-Lens Insights Beyond Repetition: Behavioural Intricacies Analysis (BIA) and Therapeutic Framework for Restricted and Repetitive Behaviours in Autism

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Abstract: Restricted and repetitive behaviours (RRBs) in autism spectrum disorder (ASD) are often described as maladaptive outputs to be extinguished, yet recent neuropsychological and developmental research highlights their potential regulatory and adaptive functions. The Behavioural Intricacies Analysis (BIA) framework (Ramesh Kumar G S 2025) reconceptualises these behaviours as contextually embedded, configurationally complex, and developmentally situated phenomena. This paper applies BIA principles to a single case of a preschool-aged child with ASD, employing a micro-session analysis across seven therapeutic encounters. Rather than presenting aggregated outcomes, the analysis dissects antecedents, behaviours, and consequences within each session, mapping them onto BIA's intricacy zones (sensory, motor, attentional, social-relational, and cognitive-symbolic). The findings demonstrate that apparent gains in compliance and eye contact frequently masked shifts in regulatory strategies shaped by hunger, fatigue, parental co-presence, and environmental novelty. Fidgeting, initially treated as a target for suppression, emerged as a benign self-regulatory mechanism whose elimination risked undermining adaptive coping. By integrating Functional Behaviour Assessment (FBA) scoring with BIA's theoretical architecture, the case illustrates how session-wise granularity exposes the developmental cascades that conventional element-based or summary case reports overlook. The implications extend beyond this case: BIA's micro-analytic approach provides clinicians and researchers with a tool for distinguishing maladaptive rigidity from adaptive self-organization, preserving autonomy while identifying ethical limits to behavioural suppression. This study contributes a

novel demonstration of BIA's clinical utility, advancing a model of autism intervention that is empirically informed, neurodiversity-affirming, and developmentally sensitive.

Keywords: *Behavioural Intricacies Analysis (BIA), Restricted and Repetitive Behaviours (RRBs), Autism Spectrum Disorder (ASD), Micro-Session case Study, Neurodevelopmental Intervention, Adaptive Vs Maladaptive Behaviours.*

1. Introduction

Repetitive and restricted behaviours (RRBs) represent a complex and enduring characteristic of autism, encompassing a spectrum from minor motor stereotypies to more pronounced insistence on sameness and circumscribed interests. These behaviours substantially influence learning, adaptive functioning, and family well-being, yet they are often insufficiently addressed and under-characterized in intervention research (Lin et al., 2023; Shimshoni et al., 2022).

A comprehensive Behavioural Intricacies Analysis (BIA) framework (G S, 2025) reconceptualizes RRBs not as singular pathologies but as diverse behavioural phenomena that require systematic functional assessment, multidimensional measurement—including sensory, motor, cognitive, and contextual factors—and iterative experimental manipulation to uncover modifiable mechanisms (Lefebvre et al., 2023; Dwyer et al., 2022; Supekar et al., 2021).

By integrating principles from single-case experimental design, naturalistic developmental behavioural interventions, and dimensional assessment, BIA explicitly links proximal function (the factors sustaining the behaviour in context) to mechanistic targets for intervention. This connection increases the precision of selecting and adjusting behavioural strategies while preserving adaptive and meaningful interests where beneficial (Kazdin, 2021; Tiede & Walton, 2019).

Implementing a formal BIA framework for RRBs addresses three critical translational gaps: (1) the need for more detailed phenotyping to differentiate sensorimotor from cognitively mediated RRBs, (2) the scarcity of mechanistically informed, replicable behavioural protocols for higher-order RRBs, and (3) the challenge of balancing reduction of harmful or disruptive behaviours with the recognition of neurodiversity and the value of functionally adaptive routines (Bishop et al., 2023; Kapp, 2020).

In practical terms, BIA supports repeated within-participant assessments (e.g., dimensional tools and ecological sampling), targeted functional analyses, and staged intervention-adjustment loops. This iterative process enables researchers and clinical teams to

generate generalizable effect estimates and mechanistic insights while reducing the risk of iatrogenic consequences (South et al., 2021; Green et al., 2022).

Repetitive and Restrictive Behaviours:

Repetitive and restrictive Behaviours (RRBs) are defining characteristics of autism spectrum disorder (ASD), encompassing a variety of actions such as repetitive motor movements, insistence on sameness, and highly restricted interests. These behaviours have been linked to underlying neurobiological mechanisms, including changes in neural circuits that are involved in executive function and emotional regulation (Zheng et al., 2025; Tian, Yang, & Zheng, 2022).

Recent research has emphasized the significance of the dorsal striatum in the expression of RRBs, indicating that dysfunctions in this region may play a role in the rigidity and inflexibility seen in individuals with ASD (Evans et al., 2024). Studies suggest that RRBs may fulfil adaptive roles, such as managing sensory experiences and alleviating anxiety, thus offering individuals a sense of predictability and control within their surroundings (Moskowitz et al., 2024).

Findings on sensory regulation strongly support the BIA principle of contextual embeddedness. RRBs here function as embedded responses to overwhelming or under-responsive sensory environments, which BIA interprets as adaptive rather than inherently pathological.

Nevertheless, when these behaviours become excessive or disrupt daily functioning, they may require intervention. Consistent prevention strategies, which involve interrupting RRBs whenever they arise, have been implemented to decrease their occurrence. Although such methods may result in short-term suppression of RRBs, they introduce complex psychological and developmental issues, including potential effects on autonomy, trust, and emotional regulation.

Functions and phenomenology of RRBs

Neuropsychological Functions of Restricted and Repetitive Behaviours in Autism Recent neuropsychological investigations have highlighted the multifaceted roles of restricted and repetitive behaviours (RRBs) in individuals diagnosed with autism spectrum disorder (ASD). Traditionally viewed through a pathological lens, emerging evidence suggests that RRBs may serve adaptive functions, particularly in sensory processing and emotional regulation.

This evolving perspective strongly supports the Behavioural Intricacies Analysis (BIA) principle of contextual embeddedness. Within this framework, RRBs are understood as

responses embedded in and shaped by environmental contingencies, rather than isolated maladaptive acts. Specifically, RRBs function as contextually situated strategies that help individuals regulate arousal and manage sensory experiences, whether by dampening hyper-responsive states or compensating for under-responsive sensory input. Such an interpretation positions RRBs as adaptive rather than inherently pathological, underscoring the need for nuanced assessment and intervention approaches that acknowledge both the protective and potentially disruptive aspects of these behaviours (Bishop et al., 2023; South et al., 2021; Uljarević et al., 2022).

Adaptive Roles of RRBs

RRBs encompass a range of behaviours, including motor stereotypies, sensory-seeking actions, insistence on sameness, and focused interests. While often perceived as maladaptive, these behaviours may fulfil regulatory roles central to an autistic way of being. A scoping review identified four key functions of RRBs: regulating sensory experiences, coping with anxiety, introducing certainty into the environment, and making sense of the world (Lung at al., 2024; McCormack, Wong & Campbell, 2022).

These findings strongly support the Behavioral Intervention Analysis (BIA) principle of contextual embeddedness, wherein behaviours are not understood in isolation but as situated responses to an individual's sensory and cognitive environment. Within this perspective, RRBs function as adaptive strategies embedded in context particularly as responses to overwhelming or under-responsive sensory conditions rather than being treated as inherently pathological. This interpretation advances a neurodiversity-affirming framework and highlights the importance of interventions that preserve the self-regulatory and meaning-making functions of RRBs, while selectively targeting only those that significantly interfere with learning, safety, or social participation (Esposito et al., 2025).

Furthermore, RRBs have been associated with enhanced cognitive and social skills. Structured repetitive behaviours may support attention and problem-solving capabilities, thereby promoting interaction with the environment (Lin et al., 2023).

Neuroimaging Insights

Neuroimaging studies have elucidated the neural underpinnings of RRBs in ASD. Altered cortico-striatal connectivity has been linked to RRBs, with evidence suggesting an imbalance between direct and indirect pathways within the basal ganglia (Soghomonian, 2024). Additionally, atypical time-varying interactions within the orbitofrontal cortex-amygdala circuit have been shown to influence RRBs, with executive functions mediating this relationship (Soghomonian, 2024; Zheng et al., 2025).

These findings strongly support the BIA principle of contextual embeddedness, wherein RRBs function as embedded responses to overwhelming or under-responsive sensory environments. Within this framework, RRBs are interpreted not as inherently pathological, but as adaptive mechanisms that reflect attempts at self-regulation and environmental negotiation. This perspective underscores the importance of assessing the sensory and contextual contingencies that maintain RRBs, thereby informing interventions that aim to modify maladaptive elements while preserving their adaptive regulatory functions."

White matter microstructure in the cortico-basal ganglia pathway has also been implicated, with findings indicating that fractional anisotropy in this region is associated with RRB severity (Wilkes et al., 2024; Farmer et al., 2024).

This evidence strongly supports the BIA principle of contextual embeddedness, wherein RRBs are understood as embedded responses to overwhelming or under-responsive sensory environments. From this perspective, BIA interprets RRBs as adaptive mechanisms for regulation and self-organization rather than inherently pathological behaviours.

Emotional Regulation and Cognitive Control

The relationship between RRBs and emotional regulation is complex. Poor emotion regulation has been uniquely associated with self-injurious behaviours, while difficulties with social communication are linked to stereotyped behaviours. These findings suggest that RRBs may be expressions of broader negative emotional states in autism (Martínez-González, Cervin, & Piqueras, 2022; Rodríguez-Jiménez & Martínez-González, 2024).

This conceptualization strongly supports the Behavioural Intricacies Analysis (BIA) principle of contextual embeddedness, in which RRBs are interpreted not as isolated deficits but as responses embedded within the broader sensory and emotional landscape of the individual. From a BIA perspective, repetitive behaviours in these contexts function as adaptive regulatory mechanisms to cope with overwhelming or under-responsive sensory environments, rather than representing inherently pathological processes (South & Rodgers, 2017; Bishop, & Lord, 2023). Recognizing the embedded and adaptive functions of RRBs underscores the importance of interventions that aim to optimize environmental and sensory conditions, rather than solely seeking to suppress the behaviours themselves.

Moreover, decreased cognitive control towards affective cues has been observed in children with ASD, particularly when these cues align with their interests. This decreased cognitive flexibility in the context of increased affective salience related to interests provides insight into how rigidity influences daily functioning in children with autism (Bos et al., 2019; Spackman et al., 2023; Lacroix et al., 2024).

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Sensory regulation and self-soothing

A significant body of contemporary research highlights sensory processing differences as a key factor driving numerous restricted and repetitive behaviours (RRBs) in autism spectrum disorder (ASD). These sensory differences represent a range of unusual reactions to sensory stimuli, including hypersensitivity, hyposensitivity, and behaviours aimed at seeking sensory input (MacLennan et al., 2021).

Such sensory processing differences are not simply peripheral characteristics; rather, they are fundamental to the core symptomatology of ASD, affecting behaviour, cognition, and emotional regulation (Neufeld et al., 2021; Kadlaskar et al., 2021).

These sensory differences represent a range of unusual reactions to sensory stimuli, including hypersensitivity, hyposensitivity, and behaviours aimed at seeking sensory input. Importantly, these observations strongly support the Behavioural Intervention Analysis (BIA) principle of contextual embeddedness, wherein RRBs function as embedded responses to overwhelming or under-responsive sensory environments. Within this framework, BIA interprets these behaviours not as inherently pathological but as adaptive strategies, providing the individual with a functional means to regulate or engage with their sensory context."

Neurobiological studies have clarified that these sensory processing differences are rooted in changes to neural circuits responsible for sensory integration. For example, research has revealed atypical functional connectivity within sensory processing networks, including the primary sensory cortices and the default mode network, which play a role in modulating sensory inputs and regulating repetitive behaviours (Park et al., 2021; Chen et al., 2021; Nair et al., 2020; Uddin, 2021).

These findings strongly support the Behavioural Intricacies Analysis (BIA) principle of contextual embeddedness, wherein RRBs are conceptualized as embedded responses to overwhelming or under-responsive sensory environments. Within this framework, such behaviours are interpreted as functionally adaptive rather than inherently pathological, emphasizing that their expression reflects attempts to self-regulate and navigate complex sensory contexts rather than solely being symptoms to suppress (Bishop et al., 2023; South et al., 2021).

These neural changes may hinder the brain's capacity to effectively filter and integrate sensory information, resulting in sensory overload or under-responsiveness, which can present as RRBs (Proff, Hojgaard, & Uddin, 2021; Gonçalves et al., 2023).

Moreover, studies have shown that sensory processing differences correlate with specific subtypes of RRBs. For instance, behaviours that seek sensory input are frequently

associated with hyposensitivity to sensory stimuli, while behaviours that avoid sensory input are linked to hypersensitivity (Narvekar et al., 2022; Ossanna, Kawora & Simonoff, 2024).

Such observations strongly support the Behavioural Intervention Analysis (BIA) principle of contextual embeddedness. Within this framework, RRBs are conceptualized not as inherently pathological behaviours but as embedded responses to overwhelming or under-responsive sensory environments. BIA interprets these behaviours as functionally adaptive attempts by the individual to regulate sensory input, highlighting the importance of understanding RRBs within the context of the environment and the neural mechanisms that shape them."

These correlations imply that RRBs may function as coping strategies to manage sensory experiences, either by pursuing additional sensory input or by evading overwhelming stimuli (Moore et al., 2021; Pang et al., 2022).

Such findings strongly support the BIA principle of contextual embeddedness: RRBs can be understood as embedded responses to sensory environments that are either overwhelming or under-responsive. Within this framework, these behaviours are interpreted as adaptive strategies tailored to the individual's immediate sensory context, rather than as inherently pathological manifestations."

The connection between sensory processing differences and RRBs also pertains to emotional regulation. Unusual sensory experiences can provoke emotional reactions such as anxiety or distress, which may further intensify RRBs as individuals strive to self-regulate their emotional states (Brandes-Aitken et al., 2024; Cárcel-López & Ferrando-Prieto, 2025).

Developmental and Longitudinal Implications

Longitudinal research indicates complex patterns for restricted and repetitive behaviours (RRBs) throughout childhood. While certain motor stereotypies may diminish as development progresses, insistence on sameness and restricted interests can continue and interact with anxiety and social challenges . Premature, indiscriminate suppression might disrupt natural developmental adaptations and hinder the acquisition of skills that arise from RRB-related cognitive processes (Masjedi et al., 2025; Keating et al., 2023).

Implications for Intervention

Understanding the neuropsychological functions of RRBs is crucial for developing interventions that respect the adaptive roles these behaviours may play. Rather than focusing solely on reducing RRBs, interventions should aim to support individuals in utilizing these behaviours constructively, promoting overall well-being and functional independence.

This longitudinal association strongly supports the BIA principle of contextual embeddedness, emphasizing that RRBs do not emerge in isolation but as situated responses to broader affective and environmental dynamics. Within this framework, RRBs can be understood as embedded regulatory behaviors that manifest in contexts of either overwhelming or under-responsive sensory input. Such a perspective reframes these behaviors as adaptive coping strategies rather than inherently pathological symptoms, underscoring the need for interventions that acknowledge and work with their contextual functions rather than solely attempting to extinguish them.

The findings by Moskowitz et al. (2024) revealed a notable interaction between the severity of ASD and anxiety symptoms during the initial assessment, which forecasted heightened sensory-motor RRBs two years subsequently.

Increased sensory-motor RRBs were anticipated by heightened ASD symptoms solely when the severity of anxiety symptoms was low. Similarly, elevated anxiety symptoms predicted increased sensory-motor RRBs only when the severity of ASD symptoms was low. Notably, this association was confined to Sensory-Motor RRBs, with indications that it might also pertain to total RRBs.

Behavioural Intricacies Analysis Model

Behavioral Intricacies Analysis Model of RRBs based on the already proposed Behaviour Intricacies Analysis framework by (G S, 2025).

The following hypotheses and predictions are original to the author as part of the proposed "*Behavioural Intricacies Analysis (BIA) framework*" (G S, 2025). BIA was introduced as a novel conceptual model designed to address the limitations of element-based approaches to behaviour modification. While the framework itself represents an original contribution, its underlying assumptions are informed and indirectly supported by recent empirical research in developmental psychology, neurocognition, and autism studies. References are therefore cited not as prior articulations of BIA, but as converging evidence that strengthens the plausibility and testability of the framework's principles. This distinction ensures that the originality of BIA is preserved while also demonstrating its alignment with current scientific findings, thereby making the framework both theoretically innovative and empirically grounded.

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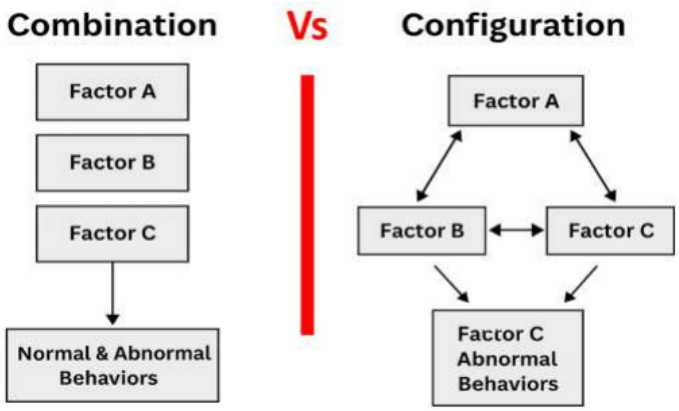

Figure 1: *Configuration of Factors Creating Intricacies*

Concept	Operational Definition	Objective / Measurable Criteria
Behavioural Intricacies Analysis (BIA)	A structured, real-time observational method mapping micro-behaviours across social, emotional, and cognitive domains.	Minimum 15-minute observation; behaviours coded using BIA domain matrix; ≥ 90% inter-rater agreement required.
Intricacies Behavioural Modification	An intervention targeting specific maladaptive linkages identified in a BIA profile.	≥ 70% of intervention activities address coded maladaptive linkages; reduction in maladaptive frequency by ≥ 20% over a 4-week period.
Dynamic Observational Framework	A flexible protocol where observation focus shifts according to live behavioural responses.	Observer changes focus domain ≥ once every 5 minutes based on predefined triggers; all shifts logged with timestamps.
AIM–BIA Hybrid Scoring	Combined quantitative AIM scores with qualitative BIA intricacy codes for dual-profile output.	Each AIM item paired with at least 1 BIA code; composite score generated; scoring completion rate = 100% per session.
Social–Emotional–Cognitive Development Hierarchy	Developmental model in which social skills support emotional growth, which in turn supports cognitive development.	Higher-tier behaviours counted only if ≥ 50% of prerequisite lower-tier behaviours are observed in the same session.
Behavioural Configuration Factors	Patterns where two or more micro-behaviours from different domains occur in close temporal sequence.	Co-occurrence window = ≤ 10 seconds; pattern must appear ≥ 3 times per session to be coded.
Individualised Autism Profiling	Personalised behavioural map showing unique strengths, challenges, and linkages across domains.	Profile includes ≥ 1 linkage per domain from ≥ 2 observation sessions; stored in standardised profile template.
Real-time Behavioural Profiling	Live categorisation of behaviours into BIA domains during observation.	Behaviour logged within ≤ 10 seconds of occurrence; coding accuracy verified by second observer in ≥ 80% of cases.

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Figure 2: *Basic Concepts in Behavioural Intricacies Analysis Framework*

Key Hypotheses

1. Behaviour is contextually embedded

Human behaviour must be analysed within relational, situational, and temporal contexts. Ignoring context risks ecological invalidity and poor long-term outcomes (Cook, 2025; Naumann, 2022).

2. Configurations, not elements, determine behavioural meaning

Outcomes emerge from configurations and sequencing of multiple subtle factors (attention, sensory, motor, social, cognitive), not additive single elements. Therapies targeting such configurations outperform those addressing discrete units (Kim, Lee, & Kim, 2022; Leonardi, et al., 2025).

3. Developmental relevance shapes behavioural interpretation

Behaviours must be interpreted relative to the child's developmental stage and adaptive potential. The same behaviour may have different implications depending on age (Schalock, et al., 2021; Zheng & Wang, 2021).

4. Intricacy zones underpin developmental cascades

Domains such as motor, sensory, attentional, cognitive, and neurobiological form interconnected 'intricacy zones' that cascade across development. Small changes in one domain may trigger wide developmental effects (Bradshaw, 2022; Iverson, 2021).

5. Oversimplification risks therapeutic misalignment

Reducing behaviour to therapist-friendly checklists erodes diagnostic accuracy and personalization. Element-based methods like ABA drills risk intervention mismatches (Gray, 2025; LaVigna & Willis, 2022).

Testable Predictions Emerging from BIA

a) Early micro-behavioural markers (e.g., pull-to-sit variability, eye contact latency) will predict later language and social development more reliably than milestone-based assessments (Bradshaw, Kyvelidou, & Bhat, 2022; Artis & McDonald, 2025).

b) Children receiving configuration-sensitive interventions (targeting attention + social responsiveness + language clusters) will show faster generalisation and more sustained gains than those in element-based programs (Carruthers & Toth, 2024; Gulsrud & Rogers, 2024).

c) Behavioural trajectories are nonlinear: improvements or regressions in one domain dynamically reconfigure other domains, producing observable 'complexity trends' (Hong et al. 2023; Kouklari et al., 2023).

d) Maladaptive complexity clusters (e.g., rigid attention + sensory avoidance + social withdrawal) predict prolonged therapy duration and poorer outcomes unless specifically targeted (Stevens et al., 2021; Gardner-Hoag et al., 2021).

e) Cross-domain coherence is a key success marker: therapeutic success is measured not only by skill attainment but also by integration of skills across domains (language use within social-emotional contexts) (Nejati, 2024; McLeod et al., 2022)

Proposed Conceptual Model

The proposed conceptual model integrates neurobiological, sensory, emotional, and communicative dimensions of Restricted and Repetitive Behaviours (RRBs) in Autism Spectrum Disorder (ASD). RRBs are conceptualized as:

1. Philosophical Basis

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***BIA Principle 1*:** Contextual Embeddedness: RRBs must be analysed in relation to situational, relational, and temporal context.

Example: Hand-flapping may regulate sensory overload in one setting, but signal social disengagement in another.

BIA Principle 2: Configurational Complexity: RRBs are not isolated "units" but emerge from configurations of sensory, social, cognitive, and motor intricacies.

Example: Echolalia may reflect a blend of communicative intent, auditory-motor processing, and anxiety regulation.

***BIA Principle 3*:** Developmental Relevance: RRBs must be interpreted relative to the child's developmental stage, not as absolute deficits.

Example: Lining up toys may scaffold attention and sequencing at age 3, but become maladaptive at age 10 if rigid

2. Intricacy Zones for RRBs

Instead of treating RRBs as one "category," BIA distributes them across intricacy zones (dynamic clusters):

***Sensory Zone*:** RRBs reflect selective perception, perceptual choice, and arousal regulation.

***Motor/Sequencing Zone*:** RRBs emerge from adaptive or maladaptive movement sequence patterns.

***Attention Zone*:** RRBs relate to attentional disengagement, shifting difficulties, and reactive focus.

***Social-Relational Zone*:** RRBs signal breakdown or adaptation in relational integration and social comprehension.

Cognitive-Symbolic Zone: RRBs relate to symbolic representation limits (e.g., rigid symbolic play, repetitive scripts).

3. Predictions (BIA-based)

The BIA-only model generates predictions at the behavioural pattern level:

RRBs will cluster differently depending on contextual demands (home vs school vs therapy).

RRBs co-occur with difficulties in adjacent zones (e.g., sensory-based RRBs often co-exist with attentional disengagement).

RRBs evolve along developmental cascades: what is adaptive early may cascade into rigidity later if unsupported.

Higher complexity in configurations, greater risk of maladaptive entrenchment if therapy reduces behaviours only superficially.

4. Therapeutic Implications

***Assessment*:** Map each RRB within its intricacy zone (not isolate it as a "target behaviour").

Intervention: Modify the configuration of factors (development based social scaffolding, sensory environment, attention supports), not just the visible RRB.

***Developmental alignment*:** Reframe RRBs as markers of developmental trajectory, and intervene by redirecting intricacy patterns.

***Therapist role*:** Psychologists (not technicians) must interpret intricate behavioural sequences to avoid oversimplification.

Summary

A BIA-only model of RRBs conceptualizes them as context-sensitive configurations of intricacy zones, interpretable through embeddedness, complexity, and developmental relevance. It avoids pathologizing or isolating RRBs, instead reframing them as dynamic behavioural phenomena that must be analysed in terms of patterns and contexts.

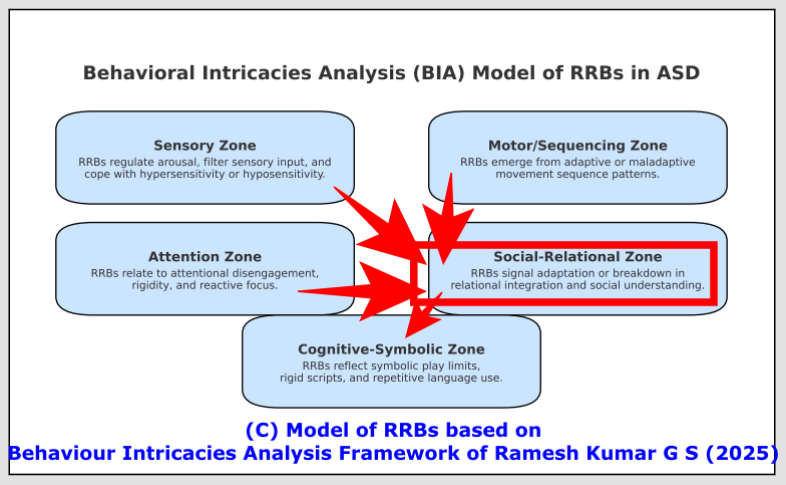

Figure 3: *The Behavioral Intricacies Analysis (BIA) framework conceptualizes restricted and repetitive behaviors (RRBs) as following a developmental trajectory organized through hierarchically interlinked functional zones.*

Micro-Session Case History

The child, referred to here as R, was born in March 2020 and is the second child of a Hindu family whose mother tongue is Hindi. He has an elder brother aged seven years who is studying in the second standard. Prior developmental and therapeutic history indicates persistent difficulties in speech, social interaction, and behavioural regulation. He had

previously received occupational therapy for two-and-a-half years, which improved gross motor development, physiotherapy for one year focusing on muscle strengthening, speech therapy for three years with minimal gains, and a six-month trial of Applied Behaviour Analysis (ABA) without perceivable improvement.

On the day of initial consultation at the current centre, R presented as highly hyperactive and unable to remain seated for even one minute. He moved continuously throughout the therapy room, did not speak or respond to verbal prompts, and did not engage in any social interaction. Eye contact could not be established or maintained. Throughout all sessions, either the father or mother was permitted to sit in the therapy room and observe directly, allowing for continuous parental engagement and real-time feedback.

Intervention sessions lasted 45 minutes each day. The first session focused on initiating eye contact, which showed gradual improvement. During the second session, R displayed resistance, which parents later attributed to being awakened from sleep prior to the session. The third session also demonstrated low compliance. By the fourth session, he was calm, cooperative, and displayed significantly reduced hyperactivity. Parents noted that his previous resistance was likely due to hunger. A subsequent 12-day gap in sessions occurred due to weekend holidays, child illness, and psychologist leave.

Upon resuming, the fifth session demonstrated notable reduction in hyperactivity within the therapy setting, and parents reported that eye contact was improving at home from the second session onward. During the sixth session, R was able to remain seated for over 30 minutes, though minor fidgeting persisted. The psychologist implemented consistent prevention of fidgeting, which led to partial reduction. By the seventh session, parents reported that R continued to move at home, but his movements were more easily controllable when instructed. Observations indicate progressive improvements in self-regulation and attention, likely attributable to consistent prevention and structured intervention (Lory, 2023).

Intervention Methods

The intervention aimed to control excessive movements and gradually improve attention, eye contact, and seated tolerance. Core strategies included: 1) Consistent prevention: every instance of fidgeting or hyperactive movement was gently interrupted and redirected; 2) Eye contact training: structured prompts and visual engagement exercises.

Sessions progressed according to responsiveness and daily observations, with adjustments made for cooperation, hunger, and fatigue.

Session-wise Observations and Outcomes

Session 1: Initial engagement with eye contact; hyperactivity uncontrolled.

Session 2: Resistance observed; cooperation poor due to being woken abruptly.

Session 3: Low compliance continued.

Session 4: Cooperation improved; hyperactivity reduced.

Sessions 5–6: Significant reduction in hyperactivity; seated tolerance improved (>30 minutes); fidgeting partially controlled.

Session 7: At-home movement easier to manage; structured instructions effective in reducing uncontrolled movement.

Parental observation throughout sessions contributed to real-time feedback.

Functional Behaviour Assessment (FBA)

Based on the case history observations across seven sessions, a Functional Behaviour Assessment (FBA) was reconstructed. Antecedents, behaviours, and consequences were analysed to hypothesise the function of the child's actions. A Likert-style scale (0 = absent, 1 = mild/infrequent, 2 = moderate/occasional, 3 = severe/frequent) was used to score the behaviours.

Table 1: *The FBA indicates that the child's hyperactivity and fidgeting behaviours were primarily driven by sensory and physiological regulation needs (scores of 3), with moderate contributions from escape/avoidance (score of 2) and attachment-based co-regulation (score of 2). Social engagement appeared secondary (score of 1). Thus, suppression of these behaviours without offering alternative regulation strategies risks eliminating adaptive coping mechanisms.*

Antecedent (A)	Behaviour (B)	Consequence (C)	Hypothesized Function	Score (0–3)
Start of session after sleep disruption	Resistance, low compliance	Refusal to engage	Escape / fatigue-related	2
Hunger / missed meal	Hyperactivity, non-seated behaviour	Unable to sustain attention	Physiological arousal / regulation	3
Therapy setting, novel tasks	Continuous movement, fidgeting	Therapist redirects, prevents movement	Sensory regulation / arousal modulation	3
Structured prompting (eye contact task)	Brief eye contact achieved	Social praise / reinforcement	Social engagement seeking	1

Parent present and attentive	Increased calm, cooperation	Positive reinforcement, security	Attachment / co-regulation	2
Extended sitting (>30 mins)	Minor fidgeting	Gentle prevention, redirection	Sensory self-regulation (benign)	1

Interpretation

The progressive improvements observed across sessions indicate that consistent prevention, combined with structured eye contact interventions and parent involvement, can lead to measurable gains in attention, seated tolerance, and control of hyperactive movements. Partial persistence of fidgeting suggests that complete suppression is neither immediate nor absolute, highlighting the need for gradual, function-based intervention. Parental presence likely enhanced cooperation and facilitated skill generalization to the home environment (Botha, 2023; Kapp, 2021).

2. Discussion

The presented case history demonstrates short-term gains in seated tolerance, eye contact, and reduced hyperactivity following consistent prevention strategies combined with parental presence. These improvements, observed within seven sessions, highlight the potential for structured therapeutic engagement to enhance immediate compliance and attentional focus. However, several critical issues emerge when evaluating this case considering contemporary neuropsychological and ethical evidence.

First, the intervention design relies heavily on suppression of hyperactivity and fidgeting through "consistent prevention." While this produced measurable reductions in overt movements, research consistently cautions that repetitive and restrictive behaviours (RRBs) often function as self-regulatory mechanisms to manage arousal, anxiety, or sensory overload (Lung et al. 2024; Collis et al., 2022). Suppressing such behaviours without simultaneously offering alternative regulation strategies can produce physiological dysregulation, as evidenced by reductions in vagal tone and heightened sympathetic activation in autistic children deprived of regulatory outlets (Muscatello, Vandekar & Corbett (2021); Sun, Zhang & Li (2024). Thus, while the child appeared calmer in session, it remains unclear whether internal stress was reduced or merely concealed.

Second, the short timeframe and variability in contextual factors limit the generalizability of findings. Resistance in earlier sessions was attributed to hunger and

disrupted sleep, both of which are well-established confounds in behavioural presentations (Randell et al., 2022). Without longitudinal follow-up, it cannot be determined whether improvements in eye contact and seated behaviour represent durable skill acquisition or transient situational compliance. Longitudinal studies emphasize that premature suppression of repetitive behaviours may disrupt developmental adaptations and hinder the acquisition of skills scaffolded by RRBs (Masjedi et al., 2025; Keating et al., 2023)

Third, the intervention used a brief functional behaviour assessment (FBA), which is critical for distinguishing whether a given behaviour is maladaptive or adaptive within a developmental and sensory framework (Lung et al., 2024). For instance, fidgeting may serve as a coping strategy for sensory modulation (Elahi, 2025; Liu, 2025). Without FBA, suppression risks eliminating potentially adaptive functions, thereby reinforcing camouflaging or substitution behaviours with greater long-term costs (Khudiakova, 2024; Cancino-Barros et al. 2025).

Finally, the relational and ethical dimensions require greater attention. Attachment-based frameworks emphasize the importance of co-regulation and trust between caregiver and child (Pereira et al., 2025; Wittkowski et al., 2025). Consistent prevention, particularly when applied without alternatives, may be perceived as intrusive, undermining relational security and autonomy. Therefore, while the short-term improvements in this case are noteworthy, they must be interpreted cautiously and situated within a broader ethical and neurodevelopmental context.

3. Conclusion

This case illustrates that consistent prevention, when combined with structured eye contact training and parental involvement, can yield observable short-term gains in compliance and attentional regulation. However, contemporary neuropsychological evidence indicates that repetitive behaviour's in autism frequently serve adaptive functions, including sensory regulation, emotional stability, and communicative signalling (Bos et al., 2019; Martínez-González, Cervin, & Piqueras, 2022; Chen et al., 2024). Suppressing these behaviour's without providing alternative self-regulatory strategies risks undermining physiological regulation, relational trust, and long-term adaptive functioning (Polizzi & Lynn, 2021).

Future interventions should integrate functional assessments, developmentally sensitive strategies, and neurobiologically informed alternatives—such as sensory integration supports, structured self-soothing routines, and heart-rate variability biofeedback (Coulter et al., 2022). In this way, therapy can move beyond surface-level behavioural compliance to foster

resilient self-regulation, preserve autonomy, and enhance the child's long-term quality of life. The present case thus underscores both the promise and the risks of suppression-based approaches, highlighting the necessity for cautious, ethically grounded, and evidence-based application.

Contributions

The contributions of this study are threefold. First, it synthesizes recent post-2020 neuropsychological and neurobiological research, highlighting dynamic network-level disruptions and their role in RRBs. Second, it reframes RRBs through the Behavioral Intricacies Analysis model, offering a novel theoretical framework that integrates adaptive, developmental, and contextual functions. Third, it provides therapeutic guidelines that emphasize identity-affirming, non-coercive, and context-sensitive interventions. Together, these contributions advance the discourse on autism research and clinical practice, providing a foundation for ethically aligned, empirically grounded, and neurodevelopmentally sensitive intervention models.

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