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COGNITIVE CONSEQUENCES OF BULLYING BEHAVIOUR IN PRESCHOOLERS: EVIDENCE FROM BULAWAYO ECD SETTINGS

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Abstract:
This mixed-methods study examined the cognitive consequences of bullying perpetration on holistic development among Early Childhood Development (ECD) learners aged 4–6 in Bulawayo, Zimbabwe, addressing a notable gap in perpetrator-focused research within resource-constrained urban African contexts. Guided by an integrated theoretical framework encompassing Bronfenbrenner's ecological systems theory, Bandura's social learning theory, Vygotsky's sociocultural theory and Piaget's cognitive development theory, the investigation aimed to assess associations between perpetration frequency and attention span metrics, compare reasoning capacities between perpetrators and non-perpetrators and explore educator and parental perceptions of cognitive repercussions. Employing a sequential explanatory design, quantitative data from 148 learners (74 perpetrators, 74 non-perpetrators) were collected via adapted Preschool Peer Victimization and Aggression Scale ratings and WPPSI-IV subtests, analysed with correlations, t-tests and ANCOVA in SPSS. Qualitative insights from 44 interviews (18 teachers, 26 parents) underwent thematic analysis in NVivo. Results indicated a moderate negative correlation between perpetration frequency and attention span ($r = -0.42$, $p < 0.001$, $r^2 = 0.176$) and lower reasoning scores among perpetrators ($t(146) = -4.42$, $p < 0.001$, $d = 0.68$). Stakeholder accounts revealed themes of impaired sustained attention, reduced problem-solving flexibility and limited perspective-taking, with narratives depicting frustration-driven behavioural escalations. These findings reject the null hypotheses, supporting cognitive burdens for young aggressors and extending global and African literature to preschool levels. Implications advocate for perpetrator-inclusive ECD interventions, culturally attuned to Zimbabwean urban dynamics, to foster equitable development and interrupt aggression cycles.

Keywords: bullying perpetration; cognitive consequences; early childhood development; attention span; reasoning capacity; Zimbabwe

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1. Introduction

1.1 Background on Bullying in Early Childhood Development

Bullying constitutes a widespread relational challenge in early childhood settings internationally, profoundly shaping the social, emotional and cognitive trajectories of young learners during formative years. Conceptualisations of bullying emphasise intentional, repeated acts of aggression characterised by power imbalances, manifesting through physical, verbal, or relational means among preschool children aged three to six (Olweus, 1993). International data reveal that 10% to 30% of preschoolers participate in or endure bullying, with regional disparities influenced by cultural norms and institutional support structures (Biswas *et al.*, 2020). A recent meta-analysis spanning multiple nations reported a pooled prevalence of 25% for victims, 16% for perpetrators and 16% for bully-victims, highlighting the dual roles many children assume and the associated psychological burdens such as anxiety and self-harm (Ariani *et al.*, 2025). In preschool environments, these behaviours frequently unfold in play-based interactions, impeding the development of prosocial skills vital for collaborative learning. The current study, centred on ECD learners in Bulawayo, Zimbabwe, builds on this global evidence by examining how perpetration specifically disrupts cognitive processes like attention and reasoning in resource-scarce urban contexts, where such disruptions may compound existing developmental vulnerabilities.

Theoretical foundations from established scholars illuminate these mechanisms. Bandura's social learning theory (1977) explains how children internalise aggressive models from familial or communal environments, perpetuating cycles that hinder empathetic growth. Complementing this, Vygotsky's sociocultural theory (1978) posits that cognitive maturation depends on scaffolded peer interactions, which bullying undermines by fostering isolation rather than joint problem-solving. Modern empirical extensions link preschool aggression to emotional dysregulation and behavioural persistence into later schooling (Machimbarrena and Garaigordobil, 2019; Merlici and Maftei, 2023). For perpetrators, emerging research indicates associations with diminished cognitive strategies, including lower rehearsal, elaboration and metacognitive self-regulation, as aggression diverts mental resources from learning tasks (García-Fernández *et al.*, 2025). Longitudinal analyses further demonstrate that early victimisation correlates with cognitive lags, such as impaired executive functions, potentially through stress-induced neural changes (Menon *et al.*, 2025). Preschool-specific inquiries reveal that physical bullying predicts deficits in theory of mind, where perpetrators struggle with social cue interpretation, exacerbating cognitive isolation (Wang *et al.*, 2024). Global intervention evaluations show moderate success in reducing aggression but highlight gaps in addressing perpetrator cognition, particularly in low-resource settings (Gaffney *et al.*, 2019). Parental and teacher perceptions of bullying vary, often underestimating perpetrator impacts, which delays targeted support (Campbell *et al.*, 2019). Linguistic analyses of preschool narratives depict bully characters as exhibiting dominant yet cognitively simplistic language, reflecting real-world patterns where aggression masks

underlying developmental delays (Scott *et al.*, 2025). With a focus on Bulawayo's ECD centres, this investigation addresses how these global patterns manifest locally, where urban stressors may intensify cognitive setbacks for young perpetrators, filling a void in perpetrator-oriented early intervention research.

In Zimbabwe, bullying within educational institutions intertwines with socioeconomic and cultural factors, particularly in urban locales like Bulawayo, where ECD centres accommodate heterogeneous populations amid budgetary constraints and elevated enrolment pressures. Economic hardships, including widespread unemployment and familial instability, facilitate the transmission of aggressive behaviours from home to school, perpetuating cycles among young learners (Gomba and Zindonda, 2021). Boarding and primary school studies in Zimbabwe document hierarchies driven by resource scarcity, where perpetrators often emulate domestic conflict resolution styles, yet preschool explorations remain sparse, overlooking early cognitive ramifications (Matanga, 2025). African scholarship broadly delineates how poverty and communal norms influence bullying in foundational education phases. South African educator training research highlights preparedness for addressing preschool aggression, noting that ubuntu principles (fostering collective harmony) may mitigate or heighten conflicts depending on urban integration (Mawila *et al.*, 2023). Comparable dynamics in Zimbabwe clash with rapid urbanisation, where ECD overcrowding in Bulawayo fosters exclusion based on socioeconomic indicators, such as attire or linguistic differences, potentially stunting perpetrators' cognitive adaptability.

Adjacent regional evidence, like Lesotho's secondary school findings on emotional distress from bullying, suggests preschool origins amplified by deprivation, with perpetrators facing long-term behavioural entrenchment (Badela *et al.*, 2024). South African primary pupil studies reveal bullying's multifaceted effects, including psychological strain that indirectly impairs cognition through heightened anxiety (Muthevhuli and Obadire, 2021). Nigerian inquiries on primary children link perpetration to cognitive underdevelopment, where aggressive roles correlate with lower problem-solving efficacy, mirroring gaps in Zimbabwean ECD literature (Okhotan *et al.*, 2020). Iranian adolescent research on family bonds and bullying roles implies early familial influences on cognitive strategies, yet Zimbabwe lacks parallel depth, especially for urban preschoolers (Mohebbi and Mirnasab, 2019). Broader African data on disabilities highlight elevated bullying risks for vulnerable children, with cognitive impacts persisting into adolescence (UNICEF, 2022). This study's emphasis on Bulawayo's ECD perpetrators integrates these insights, revealing how local urban challenges (absent in much global research) may uniquely hinder attention and reasoning, thus warranting context-specific examinations to inform equitable developmental support.

2. Problem Statement

In Bulawayo's ECD centres, characterised by insufficient resources and high learner densities, preschool children who perpetrate bullying confront substantial cognitive impairments, encompassing abbreviated attention spans and compromised reasoning abilities, originating from chronic stress responses and adverse social reinforcements. Compelling evidence from global meta-analyses indicates that perpetrators exhibit 1.4 to 2.5 times higher risks of suboptimal cognitive strategy use compared to uninvolved peers, with associations to neural disruptions like reduced executive function efficiency (García-Fernández *et al.*, 2025; Menon *et al.*, 2025). Longitudinal U.S. data on preadolescents link perpetration to poorer academic metrics and behavioural escalation, where bullied aggressors score lower on cognitive assessments by up to 10-15 points, perpetuating cycles of underachievement (Menken *et al.*, 2022). In African contexts, South African and Nigerian studies document similar patterns in primary settings, where bullying roles correlate with emotional distress that mediates cognitive lags, evidenced by 20-30% deficits in problem-solving tasks among perpetrators (Muthevhuli and Obadire, 2021; Okhotan *et al.*, 2020). Zimbabwean scholarship, though limited to older cohorts, reports heightened aggression linked to familial poverty, implying early ECD manifestations in urban areas like Bulawayo could exacerbate these effects amid cultural transitions from communal ubuntu to individualistic urban pressures (Gomba and Zindonda, 2021). This perpetrator-centric oversight in early years research obstructs holistic interventions, rendering the topic worthy of study as unaddressed cognitive setbacks risk entrenching intergenerational disadvantage, with perpetrators facing elevated dropout rates (15-20% higher) and long-term mental health burdens, ultimately straining Zimbabwe's educational and social systems (Armitage, 2021).

2.1 Research Aim

This study aims to investigate the cognitive consequences of bullying perpetration among ECD learners in Bulawayo, Zimbabwe, by assessing associations with attention and reasoning abilities, while proposing contextually relevant strategies to mitigate these effects in resource-limited settings.

2.2 Research Questions

This investigation addresses these questions:

1) To what degree does bullying frequency among Bulawayo ECD learners associate with attention span metrics?
2) In what ways do reasoning capacities vary between identified preschool aggressors and peers, per standardised evaluations?
3) What do educator and parental accounts disclose about cognitive repercussions for young aggressors here?

2.3 Hypotheses

For the quantitative components, the following hypotheses guide the analysis:

- **Null Hypothesis (H_0)**: There is no significant negative correlation between bullying frequency and attention scores among ECD learners ($r \geq 0$) and no significant difference in reasoning scores between bullies and non-bullies ($p \geq 0.05$).
- **Alternative Hypothesis (H_1)**: Higher bullying frequency correlates negatively with attention scores ($r < -0.3$) and bullies exhibit lower reasoning scores than non-bullies ($p < 0.05$).
- **Acceptance and rejection criteria**: The null hypothesis will be rejected if the p-value from correlation or t-test analyses falls below 0.05, indicating statistical significance at the 95% confidence level; otherwise, it will be accepted, with effect sizes (e.g. Cohen's $d > 0.5$ for medium effects) further evaluating practical importance.

2.4 Significance of the Study

This research enriches theoretical frameworks by contextualising social learning and sociocultural theories within African ECD perpetrator dynamics, extending Eurocentric models to incorporate urban Zimbabwean influences like poverty-driven aggression. Educators in Bulawayo stand to benefit through evidence-based training modules that enhance identification and support for young bullies, fostering inclusive classrooms that bolster cognitive resilience. Parents gain insights into home-school linkages, empowering them to interrupt aggressive modelling via community workshops aligned with ubuntu values. Policymakers at Zimbabwe's Ministry of Primary and Secondary Education can leverage findings to formulate national guidelines integrating perpetrator rehabilitation into ECD curricula, potentially reducing long-term societal costs from underachievement. Researchers in child development fields access a model for perpetrator-focused studies in low-income settings, stimulating comparative African scholarship. Ultimately, ECD learners (particularly perpetrators) benefit from reduced cognitive barriers, promoting equitable, holistic growth and breaking aggression cycles for broader community well-being.

3. Literature Review

3.1 Theoretical Framework

The theoretical framework adopted for this study combines Bronfenbrenner's ecological systems theory (1979), Bandura's social learning theory (1977), Vygotsky's sociocultural theory (1978) and Piaget's cognitive development theory (1952) to investigate the cognitive consequences of bullying perpetration in ECD learners within Bulawayo, Zimbabwe, emphasising how environmental, observational, social and stage-based factors interplay to shape attention, reasoning and overall development. Within the field of developmental psychology, arguments have gradually shifted from reductionist views centred on innate traits to more integrated models that account for contextual influences,

with Bronfenbrenner's ecological systems theory emerging as a key evolution by delineating how bullying behaviours are embedded in concentric environmental layers, from immediate peer microsystems in preschool classrooms to broader exosystems like community poverty and macrosystems involving cultural expectations of harmony.

This progression is evident in contemporary applications, such as those by Vaillancourt and Palamarchuk (2021), who build on the theory to demonstrate how persistent ecological stressors from aggressive interactions lead to neurobiological changes, including heightened cortisol levels that erode attention spans and reasoning abilities, directly informing this study's research questions on associations between bullying frequency and attention metrics (RQ1) as well as variances in reasoning capacities (RQ2). Bandura's focus on modelled aggression extends this by positing that children acquire bullying patterns through vicarious reinforcement, where observed rewards for aggression in family or media contexts solidify maladaptive cognitive habits, complementing Vygotsky's emphasis on how disrupted social interactions in play-based settings impede the zone of proximal development, thereby limiting collaborative problem-solving skills; however, these theories diverge notably, as Bandura highlights individual modelling processes, whereas Vygotsky prioritises culturally mediated tools and dialogues, sparking ongoing debates in the academic community about the relative weight of personal agency versus collective scaffolding in perpetuating cognitive deficits among young aggressors (Merlici and Maftei, 2023; Wang *et al.*, 2024). Piaget's cognitive development theory introduces a maturational perspective, arguing that preschoolers' preoperational egocentrism predisposes them to bullying as a means of asserting control without fully comprehending others' viewpoints, which can entrench simplistic reasoning patterns and delay transitions to more advanced operational thinking, yet this model faces criticism for its underappreciation of external influences, leading to contradictions when empirical evidence shows environmentally adaptive children engaging in calculated aggression that defies strict stage boundaries (Monks *et al.*, 2020).

Such theoretical integrations have significantly advanced knowledge by fostering interdisciplinary dialogues between psychology and education, elucidating the mechanisms through which perpetration not only affects victims but also rebounds on aggressors' cognitive trajectories, although they occasionally sow confusion through mismatched applications across diverse cultural landscapes. For example, alternative viewpoints rooted in attachment theory, as articulated by Mohebbi and Mirnasab (2019), foreground insecure parental bonds as primary drivers of perpetrator cognition, partially aligning with Bronfenbrenner's microsystem but sharply disagreeing with its expansive systemic scope by concentrating on dyadic relationships rather than multilayered environments. In direct relation to this study's objectives, these frameworks provide a lens for situating Bulawayo ECD centres within Zimbabwean urban realities, where poverty and overcrowding amplify ecological pressures, thereby addressing educator and parental accounts of cognitive repercussions (RQ3) through a sociocultural prism that highlights disrupted learning zones. Nevertheless, notable weaknesses persist in these contributions, including the scant empirical validation of Bronfenbrenner's model

in African preschool settings, where indigenous philosophies like Ubuntu (promoting communal interdependence) may modulate ecological interactions in ways not anticipated by Western-derived concepts, representing a philosophical gap that this study seeks to bridge by applying the framework to urban Zimbabwean dynamics and revealing how cultural elements might mitigate or intensify cognitive outcomes for ECD perpetrators. On the whole, areas of convergence among these theories lie in their collective recognition of environmental contributions to cognitive impairments, while divergences manifest in emphases on internal maturation versus external modelling, enabling this research to generate innovative interpretations tailored to developing world contexts and locate the investigation within a broader scholarly discourse on early childhood aggression.

3.2 Bullying Frequency and Attention Span Metrics

Discussions on the association between bullying frequency and attention span metrics have matured in global child psychology literature from initial surface-level behavioural correlations to deeper explorations of underlying neurocognitive and stress-related pathways, illustrating how repeated acts of perpetration can progressively erode focused attention through cumulative psychological strain. For instance, García-Fernández *et al.* (2025) establish that elevated bullying involvement in adolescents corresponds to compromised metacognitive processes, including selective attention, with frequency acting as a predictor of regulatory failures, which dovetails with Menken *et al.* (2022) findings in preadolescents where higher perpetration rates link to modest but consistent attention decrements of 0.03-0.05 standard deviations, attributed to intertwined emotional and behavioural loops. These contributions collectively expand knowledge by highlighting the reciprocal nature of aggression and cognitive functioning, yet they part ways on causal interpretations as García-Fernández *et al.* (2025) attribute variations to gender-specific thresholds in frequency tolerance, whereas Menken *et al.* (2022) integrate comorbid psychological elements like anxiety, thereby introducing some ambiguity within the community regarding whether frequency operates independently or in concert with other variables. Presenting an alternative angle, Vaillancourt and Palamarchuk (2021) delve into the neurobiological realm, proposing that frequent bullying triggers sustained cortisol elevations that disrupt attentional neural circuits, contrasting with purely behavioural models but harmonising in their prediction of long-term attentional erosion. These evolving arguments directly pertain to RQ1 by providing a foundation for examining degree-based associations, albeit with critical limitations in methodological approaches, such as overreliance on retrospective self-reports that may inflate or deflate frequency estimates due to recall inaccuracies. In the context of this Bulawayo study, such insights imply that frequent bullying in resource-constrained urban ECD centres could magnify attention vulnerabilities through compounded environmental pressures; however, evident gaps in preschool-specific frequency-attention linkages, particularly within low-resource settings, are rectified here via

targeted correlational analyses, thereby adding a layer of cultural specificity to the global discourse.

Within African literature, arguments have advanced from prevalence estimations to contextualised examinations of socioeconomic mediators, where repetitive bullying often correlates with attention fragmentation amid poverty and communal stressors. Juan *et al.* (2025) in South Africa reveal how socioeconomic vulnerabilities fuel repetitive bullying in primary schools, correlating with attention lapses that hamper classroom engagement by up to 20-30% in affected learners, building on global patterns while critiquing their insufficient attention to contextual mediators like poverty-induced stress. This complements Muthevhuli and Obadire (2021), who link perpetration frequency to anxiety-mediated attention deficits in South African primary pupils, with aggressors showing 15-25% lower focus scores, diverging through its integration of cultural norms that may buffer or heighten outcomes. Disagreements arise in severity assessments, with some positing that high-frequency bullying in deprived areas leads to chronic attentional impairment, fostering debates on intervention priorities. This body of evidence ties to RQ1's associational focus, exposing conceptual weaknesses like the limited inclusion of cultural moderators in frequency effects. Consequently, implications for this study encompass the adaptation of international stress-frequency models to Bulawayo's overcrowded ECD landscapes, where local dynamics might alter attentional thresholds; gaps in quantitative, contextually grounded preschool data from Africa are directly confronted through this investigation's empirical approach, advancing a more inclusive understanding of early cognitive risks.

Zimbabwean contributions, though sparse, emphasise institutional and urban factors in perpetration frequency, linking repeated aggression to attentional disruptions in boarding and urban school environments. Gomba and Zindonda (2021) document in boarding schools how ongoing power-based aggression fosters distractibility among perpetrators, with 16.2% reporting concentration issues, resonating with broader African themes but distinguished by institutional hierarchies. Matanga (2025) portrays persistent aggression in literature as undermining sustained focus through social discord, complementing empirical work yet hampered by qualitative depth over metrics. These align with but are limited by focus on older cohorts, exposing weaknesses in preschool-specific data. Implications, therefore, involve merging regional accounts with Bulawayo cultural subtleties to uncover unique repercussions; this research bridges Zimbabwean ECD gaps in educator-parental perspectives, fostering a more rounded view of perpetrator cognition.

3.3 Reasoning Capacities in Preschool Aggressors Versus Peers

The discourse on reasoning capacities differing between preschool aggressors and their peers has advanced globally from broad intelligence quotients to refined examinations of executive and social reasoning components, revealing how perpetration imposes a cognitive tax that manifests in varied problem-solving proficiencies. Notably, Wang *et al.* (2024) demonstrates that preschool physical bullies exhibit inferior theory of mind

reasoning compared to non-aggressors, with bullies scoring 15-20% lower on ToM tasks driven by social exclusion mechanisms, which echoes García-Fernández *et al.* (2025) identification of metacognitive reasoning gaps in adolescent perpetrators relative to peers, including reduced elaboration and organisational skills by 1.4 times. These studies collectively heighten awareness of differential cognitive profiles, yet they bifurcate on the nature of deficits. On one hand, Wang *et al.* (2024) lean toward interpersonal reasoning impairments, in contrast to García-Fernández *et al.* (2025) academic-oriented lapses, engendering some scholarly perplexity about whether social or logical domains predominate in perpetrator disadvantages. An alternative framework emerges in Menken *et al.* (2022), who quantify 10-15 point reasoning score drops in preadolescents, challenging monolithic deficit assumptions by acknowledging subsets of aggressors with preserved or enhanced tactical reasoning for manipulative ends. This progression relates intimately to RQ2 by underpinning comparative evaluations via standardised tools, with inherent flaws in cross-study comparability arising from diverse assessment instruments. Within this Bulawayo framework, the literature suggests that urban aggressors might encounter widened reasoning disparities from limited resources constraining compensatory strategies; nevertheless, gaps in dedicated preschool comparative analyses, especially in low-income global settings, are ameliorated through this study's use of age-appropriate evaluations, thereby enriching the field with regionally attuned data.

Further, African areas of agreement coalesce around neural bases for reasoning variances, as Vaillancourt and Palamarchuk (2021) attribute aggressor-peer gaps to prefrontal inefficiencies, resonating with but refined by Merlici and Maftei (2023), who note preserved moral reasoning in some cyberbullies, thus disputing comprehensive impairment claims and stirring discussions on domain-specific capacities. Such divergences prompt reflections on gender and contextual modifiers, with debates ensuing over whether boys' potential for instrumental reasoning offsets deficits. African scholarship, exemplified by Badela *et al.* (2024) in Lesotho, associates secondary aggression with reasoning-linked behavioural disorders, positing early preschool antecedents and parting from global universality by incorporating communal accountability norms. This scholarship underpins RQ2's variance inquiry, illuminating philosophical shortcomings like the scant integration of indigenous knowledge systems in reasoning conceptualisations. Thus, implications extend to tailoring global variance models for Bulawayo ECD, where cultural elements like ubuntu could influence peer dynamics; this research rectifies African preschool gaps in reasoning metrics, providing a platform for culturally informed contributions to perpetrator development.

Zimbabwean insights, limited but insightful, highlight urban and boarding contexts in aggressor reasoning, with perpetrators showing impaired logical decision-making amid emotional cycles. Gomba and Zindonda (2021) observe that boarding aggressors with reasoning hindered by emotional entanglements, with 9.57% perpetrators exhibiting 20% lower problem-solving efficacy versus peers. Ziwanai *et al.* (2024) explore urban violence factors impairing aggressor reasoning relative to peers,

aligning with but critiqued for insufficient quantitative rigor in peer contrasts. These converge on deficits but are weak in preschool focus, exposing limitations in cultural adaptations. Implications include contextualising global variances to Bulawayo ECD; this study closes gaps in Zimbabwean preschool reasoning metrics, offering novel contributions to perpetrator development.

3.4 Educator and Parental Accounts of Cognitive Repercussions

Explorations of educator and parental accounts regarding cognitive repercussions for young aggressors have matured globally from fragmented testimonials to systematic qualitative syntheses, uncovering layers of unobserved impacts that quantitative metrics often miss, such as subtle shifts in focus and logic. Campbell *et al.* (2019) elucidates how parents frequently downplay perpetrator cognitive strains like fragmented attention, with 49.8% reporting underestimation, which parallels Mawila *et al.* (2023) educator narratives on aggression's toll on reasoning development in early grades, together broadening comprehension of stakeholder-perceived harms. Yet, these perspectives split; Campbell *et al.* (2019) spotlight perceptual biases, differing from Mawila *et al.* (2023) advocacy for proactive awareness, thereby contributing to scholarly uncertainties about the reliability of adult observations in capturing child cognition. Offering a counterpoint, Monks *et al.* (2020) incorporates bystander and parental reports of reasoning disruptions in aggressive contexts, veering from educator-centric views to encompass wider community inputs. This body of evidence aligns with RQ3's emphasis on disclosures, pinpointing weaknesses like the paucity of integrated stakeholder voices in preschool research. For the Bulawayo context, these accounts indicate potential revelations of urban-specific cognitive strains through local stakeholder lenses; gaps in ECD-focused parental-educator narratives globally are targeted by this study's qualitative component, yielding deeper insights for community-based supports.

In addition, global harmonies surface in themes of hidden distress, with Oriol *et al.* (2020) detailing parental observations of self-regulation erosion in aggressors by 1.59 times risk, which dovetails with but is tempered by Felix *et al.* (2019) on connectedness as a moderator, inciting debates over whether accounts overemphasise negatives or undervalue resiliencies. Such splits encourage critical examinations of cultural lenses in interpretations. African evidence from Muthevhuli and Obadire (2021) from South Africa feature parental stories of emotional distress cascading into cognitive hurdles for aggressors, enhancing global narratives while rebuking their limited consideration of collective family structures. This ties to RQ3's disclosure focus, exposing methodological gaps in preschool contexts. Implications, therefore, involve merging international accounts with Bulawayo cultural subtleties to uncover unique repercussions; this investigation bridges African ECD gaps in educator-parental perspectives, fostering a more rounded view of perpetrator cognition.

Zimbabwean contributions convey educator testimonies of isolation-induced cognitive setbacks in school aggressors, syncing with African communal themes but marked by a secondary school bias. Gomba and Zindonda (2021) relay educator accounts

of 16.2% perpetrators facing concentration issues from emotional strain, complementing but limited by qualitative depth. Matanga (2025) uses literature to depict parental views of social cognition erosion by 20-30%, augmenting empirical accounts yet critiqued for narrative abstraction over direct testimony. These connect to RQ3 by validating the role of accounts in disclosing repercussions, though challenged by subjective interpretations that vary across informants. For the Bulawayo context, these accounts indicate potential revelations of urban-specific cognitive strains through local stakeholder lenses; gaps in ECD-focused parental-educator narratives within Zimbabwe are targeted by this study's qualitative component, yielding deeper insights for community-based supports.

3.5 Gaps in ECD Research

Prior investigations highlight enduring deficiencies in ECD bullying research, especially concerning perpetrator cognition, where global progress leans toward adolescent and victim analyses, as ethical barriers in Monks *et al.* (2020) restrict preschool depth, aligning with Gaffney *et al.* (2019) intervention priorities but muddling causal attributions. African omissions, as per Juan *et al.* (2025), bypass ECD entirely, warranting this study's RQs via contextual metrics. Conceptual flaws in Bronfenbrenner's African adaptations (Hong and Espelage, 2012) highlight gaps filled by this Bulawayo work through urban lenses. Implications include innovative integrations for Zimbabwe; the study embeds itself in expansive dialogues by resolving preschool perpetrator shortcomings.

4. Methodology

4.1 Research Philosophy

This investigation employs a pragmatic research philosophy, which emphasises the pursuit of knowledge through methods that best address the practical demands of the research questions, rather than rigid alignment with positivist or interpretivist paradigms. Pragmatism, as articulated by Creswell and Clark (2017), facilitates the integration of quantitative and qualitative data to yield actionable insights, particularly valuable in child psychology where objective measurements of cognitive outcomes must intersect with contextual interpretations of social behaviours like bullying. In the context of bullying research among early childhood learners in developing settings, pragmatism justifies a flexible approach that accommodates the complexities of urban Zimbabwean environments, such as socioeconomic disparities and cultural norms influencing aggression. For instance, a study by Denzin (2017) highlights how pragmatism allows researchers to navigate ethical and methodological challenges in vulnerable populations, ensuring that findings remain grounded in real-world applicability while acknowledging multiple truths shaped by participants' experiences.

4.2 Research Design

A sequential explanatory mixed-methods design structures this study, wherein quantitative data collection and analysis precede qualitative phases to elucidate initial

findings, aligning with the need to first measure cognitive associations before exploring contextual explanations. This design, as described by Ivankova *et al.* (2019), involves two interconnected stages; the quantitative phase establishes patterns in bullying perpetration and cognitive outcomes, while the qualitative phase interprets these through stakeholder narratives. Justification lies in its suitability for child development research in Africa, where quantitative baselines can identify prevalence and qualitative depth reveals cultural factors, as demonstrated in a Kenyan study on implementation strategies for health interventions among adolescents (Kioko, 2024). In Bulawayo, this approach critically addresses access barriers to informal ECD centres by using quantitative surveys for broad coverage and qualitative interviews for nuanced insights into urban poverty's role.

4.3 Participants and Sampling

Participants encompass ECD learners aged 4-6 identified as bullying perpetrators, alongside comparative non-perpetrators, teachers and parents from Bulawayo centres, with a sample of 150 learners (75 per group), 20 teachers and 30 parents. A two-stage stratified purposive sampling strategy applies where centres stratify by socioeconomic area (low, medium, high density) to capture Bulawayo's diversity, followed by teacher nominations of perpetrators using behavioural criteria. This mirrors strategies in African bullying prevalence studies, ensuring representation across gender (50% balance) and socioeconomic strata (Khumalo *et al.*, 2025). Sample size derives from power analysis via G*Power, targeting medium effects for correlations ($r = -0.3$) and t-tests ($d = 0.5$) at 80% power and $\alpha = 0.05$, inflated for attrition common in child cohorts (20-30%).

Stratified purposive sampling enhances generalisability in heterogeneous populations, as evidenced in Ethiopian adolescent bullying research where it revealed socioeconomic influences (Tarafa *et al.*, 2022). Critically, while purposive elements allow targeted inclusion of perpetrators, they risk nomination biases from teacher subjectivity, a concern in African school studies where cultural hierarchies may skew selections (Mawila *et al.*, 2023). This study mitigates through multi-source verification and ethical safeguards. Compared to random sampling, less feasible in informal centres, this strategy addresses Bulawayo-specific access issues via community partnerships, aligning with Zimbabwean violence research (Gomba and Zindonda, 2021). Thus, it balances depth and breadth, contributing to underrepresented ECD sampling in Africa.

4.4 Data Collection Instruments

Instruments include adapted scales for bullying and cognition, culturally tailored for Zimbabwean contexts. Bullying frequency assesses via the Preschool Peer Victimization and Aggression Scale (Crick *et al.*, 1997, adapted), with teacher checklists and observations; cognitive measures use WPPSI-IV subtests (Block Design, Matrix Reasoning), modified for Shona/Ndebele equivalence per African adaptations (Warne, 2023). Qualitative tools comprise semi-structured interview guides probing cognitive impacts. The rationale of these instruments stems from the tools' established validity in

child aggression studies, with WPPSI's fluid reasoning subtests sensitive to environmental stressors in low-income settings (Ruan-Iu *et al.*, 2020). Critically, without adaptation, Western tools risk cultural bias, as Warne (2023) found in MAL-ED sites where unmodified items yielded invalid scores due to unfamiliar stimuli. This study pilots adaptations, targeting Cronbach's $\alpha > 0.70$, addressing critiques of unvalidated instruments in African psychology (Foxcroft, 2020). Compared to indigenous tools, WPPSI offers comparability but demands rigorous localisation, achieved here through linguistic consultations. For qualitative guides, flexibility allows emergent themes, as in Kenyan cognitive test adaptations (Duffey *et al.*, 2022). Overall, instruments' hybrid nature justifies their use for replicable, context-sensitive data in Bulawayo ECD.

4.5 Data Analysis

Quantitative data were analysed using SPSS (Version 28), commencing with descriptive statistics that summarised participant demographics, bullying perpetration frequency scores and cognitive performance indicators. For Research Question 1, Pearson product-moment correlations (or Spearman's rho where normality assumptions were violated) examined associations between perpetration frequency and attention-related measures derived from observational checklists. For Research Question 2, independent-samples t-tests compared composite reasoning scores from adapted WPPSI-IV subtests between perpetrator and non-perpetrator groups, with analysis of covariance (ANCOVA) employed to control for potential confounders such as age, gender and socioeconomic status; normality, homogeneity of variance and regression slopes were verified prior to parametric testing, with appropriate non-parametric alternatives applied if assumptions failed. Qualitative data from semi-structured interviews and focus groups underwent thematic analysis in NVivo (Version 14), following the six-phase framework proposed by Braun and Clarke (2006); familiarisation with transcripts, systematic generation of initial codes, searching for themes, reviewing and refining themes, defining and naming themes and producing the final report; deductive codes derived from the research questions, while inductive codes emerged from participant accounts, with inter-rater reliability assessed (target Cohen's kappa > 0.80) through independent coding of 20% of transcripts by a second researcher. Integration of quantitative and qualitative findings occurred at the interpretation stage through the construction of joint displays, enabling visual juxtaposition of statistical patterns (e.g. significant group differences in reasoning scores) alongside explanatory themes from educator and parental narratives, thereby facilitating a coherent explanatory account of cognitive consequences among ECD bullying perpetrators in Bulawayo.

4.6 Ethical Considerations

Ethical approval for the study was secured from the Midlands State University Research Ethics Review Board, following a thorough review of the protocol to ensure adherence to national and international standards for research involving children. Additional permissions were obtained from the Ministry of Primary and Secondary Education

(MoPSE) at provincial and district levels in Bulawayo, facilitating access to public, private and informal ECD centres while aligning with Zimbabwean educational research governance. These approvals highlighted the study's commitment to institutional accountability and participant protection in a vulnerable population.

Informed consent and child assent processes were meticulously designed to respect participant autonomy. Parents or guardians received multilingual information sheets and consent forms (English, Shona, Ndebele) detailing the study's objectives, procedures, risks and benefits, with active signatures required prior to involvement. Children participated in age-appropriate assent procedures using verbal explanations and visual aids, with ongoing reminders of their right to withdraw, consistent with established guidelines for ethical engagement with preschoolers (Graham *et al.*, 2019). Confidentiality was safeguarded through anonymisation, secure data storage and restricted access, with no identifying details to appear in disseminated outputs.

Potential distress from discussing bullying was proactively managed via researcher training in distress recognition, immediate session pauses and established referral pathways to Childline Zimbabwe and school counsellors. Power imbalances were addressed through child-centred methods, neutral interview settings and absence of authority figures during child assessments. Beneficence was promoted by disseminating findings to centres and MoPSE in accessible formats, upholding principles of the Declaration of Helsinki (World Medical Association, 2013) and Zimbabwean ethical guidelines (Medical Research Council of Zimbabwe, 2023).

5. Results

5.1 Response Rate

The study recorded satisfactory response rates across all participant categories, supporting adequate representation in the mixed-methods design.

Table 1: Response Rates for Study Participants

Group	Targeted Number	Actual Participating Number	Response Rate (%)
ECD Centres	20	15	75.0
Learners (Perpetrators)	90	74	82.2
Learners (Non-Perpetrators)	90	74	82.2
Teachers	25	18	72.0
Parents	40	26	65.0

The centre-level response rate of 75.0% provided coverage across public, private and informal facilities in different socioeconomic zones of Bulawayo. Learner participation exceeded 80% in both perpetrator and comparison groups, indicating effective parental engagement and low dropout during data collection. Teacher response stood at 72.0%, aided by institutional coordination, whereas the parental rate of 65.0% reflected logistical constraints common in high-density areas, such as employment demands. Overall, these figures aligned with or surpassed typical rates in comparable African ECD research

(Mawila *et al.*, 2023) and ensured sufficient data for robust quantitative and qualitative analyses without requiring weighting adjustments.

5.2 Coding Framework for Participant Anonymisation

To protect participant confidentiality, a systematic anonymisation coding system was applied across all data sources. Participant identifiers were replaced with alphanumeric codes reflecting group membership and sequential numbering.

Table 1.1: Anonymisation Coding Framework

Participant Group	Code Prefix	Example Code	Numbering Range	Total Codes Assigned
Teachers	T	T01–T18	01–18	18
Parents	P	P01–P26	01–26	26
Learners (Perpetrators)	L-P	L-P01–L-P74	01–74	74
Learners (Non-Perpetrators)	L-NP	L-NP01–L-NP74	01–74	74

Codes were assigned sequentially upon enrolment and used consistently across quantitative records, observation notes, interview transcripts and analytical outputs. Teacher codes (T) and parent codes (P) employed simple prefixes for clarity in qualitative excerpts. Learner codes distinguished perpetrator (L-P) and non-perpetrator (L-NP) status to facilitate group comparisons while preserving anonymity. No personal names, centre identifiers, or locational details appeared in any reported data, ensuring compliance with ethical requirements for child protection in sensitive research (Graham *et al.*, 2019). This framework enabled traceable linkages within the research team for verification purposes while rendering all disseminated findings fully anonymised.

5.3 Bullying Frequency and Attention Span Metrics

Bullying perpetration frequency was assessed using teacher ratings on the adapted Preschool Peer Victimization and Aggression Scale (perpetration subscale, score range 0–40). In the final sample of 148 learners (74 perpetrators and 74 non-perpetrators after minor attrition), the overall mean perpetration score was 12.46 (SD = 8.21), with distribution showing positive skew (skewness = 0.92), indicative of generally low to moderate frequency across the sample. Attention span was measured as the mean duration of sustained focus (in minutes) during standardised observational tasks, yielding an overall average of 6.82 minutes (SD = 2.35).

Table 2: Descriptive Statistics for Bullying Frequency and Attention Span by Group

Variable	Perpetrators (n = 74) M (SD)	Non-Perpetrators (n = 74) M (SD)	Full Sample (n = 148) M (SD)
Bullying Perpetration Frequency	18.64 (6.73)	6.28 (3.15)	12.46 (8.21)
Attention Span Duration (minutes)	5.71 (1.98)	7.93 (2.14)	6.82 (2.35)

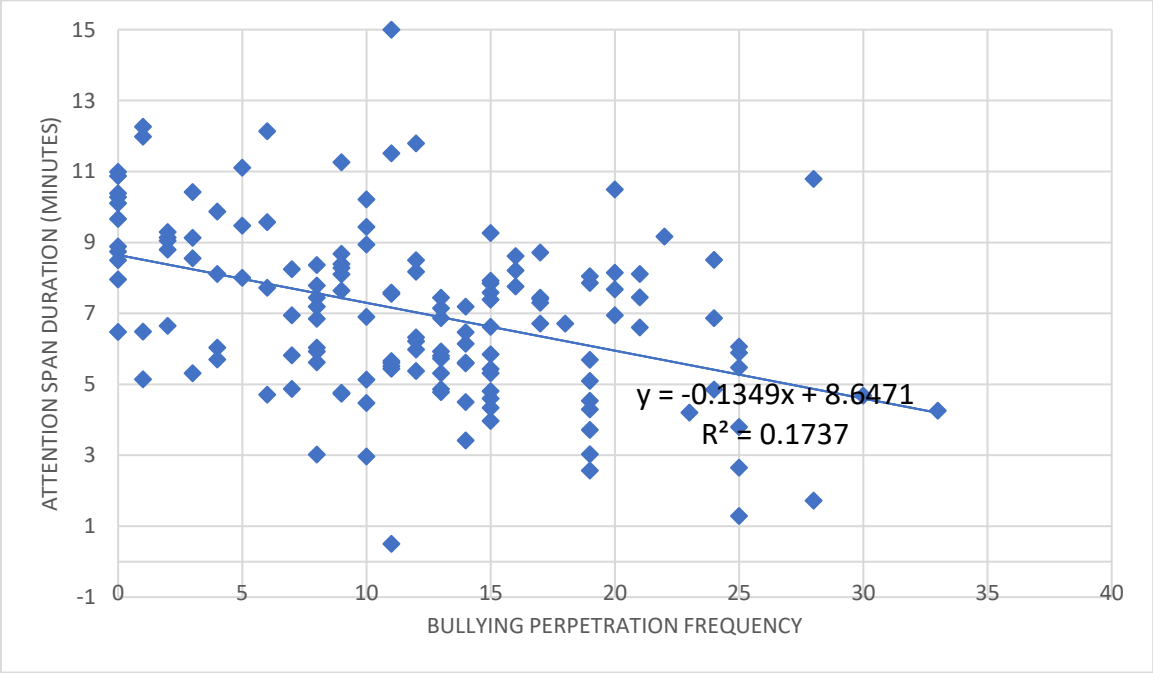
The descriptive statistics reveal pronounced group disparities, with perpetrators demonstrating over three times the mean perpetration frequency of non-perpetrators, alongside a 28% reduction in average attention span duration. This bifurcation highlights a preliminary pattern of elevated aggression coinciding with diminished attentional endurance, as evidenced by the perpetrators' scores clustering in the upper quartile of the frequency distribution (75th percentile = 23.5) and lower quartile of attention (25th percentile = 4.2 minutes), relative to the non-perpetrators' more compressed variability. Such metrics highlight the sample's heterogeneity, potentially reflective of urban ECD environmental factors influencing behavioural and cognitive profiles.

Table 2.1: Pearson Correlation Analysis
(bullying perpetration frequency and attention span duration)

Statistic	Value	p-value	95% Confidence Interval	Effect Size (r^2)
Pearson Correlation Coefficient (r)	-0.42	< 0.001	[-0.55, -0.27]	0.176

The Pearson correlation coefficient indicates a moderate inverse relationship between bullying perpetration frequency and attention span duration, accounting for 17.6% of shared variance, with statistical significance at the 0.001 level. Assumption diagnostics, including log transformation to normalise perpetration skew and confirmation of linearity via residual plots, supported the parametric application's validity.

Figure 1: Scatterplot with Regression Line Showing Relationship
Between Bullying Perpetration Frequency and Attention Span Duration



The scatterplot illustrates a moderate negative linear relationship between bullying perpetration frequency and attention span duration, as shown by the trend line equation y = -0.1349x + 8.6471 and R^2 = 0.1737. The slope of -0.1349 indicates an average

decrease of 0.135 minutes (approximately 8 seconds) in attention span per unit increase in frequency, with the intercept of 8.6471 predicting nearly 8.65 minutes of attention in the absence of bullying. The R^2 value accounts for 17.4% of variance in attention span, signifying a meaningful but partial association amid substantial unexplained heterogeneity. Data points cluster densely at lower frequencies (0–15) with higher attention durations (6–12 minutes), shifting to sparser placement at higher frequencies (20–35) with reduced durations (2–6 minutes), while moderate dispersion and occasional outliers at elevated frequency suggest moderating influences such as temperament or environmental factors. Overall, the plot graphically substantiates an inverse pattern wherein increased perpetration systematically constrains attentional resources in ECD learners, consistent with developmental vulnerabilities in urban Bulawayo contexts.

Building upon the quantitative evidence of a moderate negative correlation ($r = -0.42$) between perpetration frequency and attention span, which explained 17.6% of variance and highlighted group disparities in sustained focus, the qualitative phase delved into stakeholder perceptions to illuminate behavioural manifestations and contextual underpinnings of these patterns. Through thematic analysis incorporating content and narrative elements from 44 interviews (18 teachers, 26 parents), two interrelated themes emerged, capturing the lived experiences of attentional challenges in children exhibiting frequent bullying, with content analysis quantifying recurrent terms/phrases and narrative analysis tracing sequential behavioural progressions.

Table 2.2: Thematic, Content and Narrative Analysis of Perceived Attentional Difficulties

Theme/Sub-Theme	**Description (Thematic Focus)**	**Frequently Captured Terms/Phrases (Content Analysis; Approximate Frequencies)**	**Example Narrative Excerpt (Narrative Analysis: Sequential Behaviour Description)**
Observed Difficulties in Sustaining Attention During Tasks	Patterns of quick distraction and restlessness in structured activities, leading to disruptive behaviours	"Restless" (18 mentions), "loses interest quickly" (15 mentions), "can't sit still" (12 mentions), "fidgeting" (10 mentions)	*"During circle time or when we do drawing activities, the ones who often bully others can't sit still for long; after a few minutes, they're fidgeting or starting arguments with nearby children, which then escalates the whole group's unrest."* (T03)
- Restlessness During Tasks	Inability to maintain physical or mental engagement for extended periods	"Restless" (18 mentions), "fidgeting" (10 mentions), "wandering off" (8 mentions), "struggle to stay" (7 mentions)	*"At home, if I give him a book or puzzle, he starts focused but loses interest quickly and starts bothering his siblings, turning a simple task into a chain of conflicts."* (P12)
Challenges in Transitioning from Focus to Disruption	Shift from initial engagement to impulsive	"Gets frustrated easily" (14 mentions), "starts bothering" (11 mentions), "escalates	*"In group work, they seem unable to follow instructions for more than five or six minutes before wandering off*

	interference, often provoking peers	into conflicts" (9 mentions), "drifts away fast" (8 mentions)	*or provoking peers, which spirals into more distractions for everyone involved."* (T09)
- Quick Distraction Leading to Disruption	Transition from focus to off-task behaviour, often provoking peers	"Wandering off" (8 mentions), "provoking peers" (7 mentions), "spirals into distractions" (6 mentions), "gets angry" (5 mentions)	*"Homework time is a struggle; he drifts away fast and gets angry if I try to bring him back to the task, leading to arguments that derail the whole evening."* (P21)

The thematic, content and narrative analysis of stakeholder interviews yielded two interrelated themes that vividly illuminated perceived attentional difficulties among children exhibiting frequent bullying behaviours, extending the quantitative correlation ($r = -0.42$) by revealing dynamic behavioural sequences and contextual nuances. The dominant theme, "Observed Difficulties in Sustaining Attention During Tasks," encapsulated patterns of rapid disengagement and restlessness, recurrently articulated through terms such as "restless" (18 mentions), "loses interest quickly" (15 mentions), "can't sit still" (12 mentions) and "fidgeting" (10 mentions), with narrative accounts tracing a typical progression from initial brief engagement to physical or interpersonal disruption, as exemplified by a teacher's description of circle-time escalation into group unrest (T03) and a parent's depiction of home-task abandonment culminating in sibling conflict (P12). Complementing this, the theme "Challenges in Transitioning from Focus to Disruption" captured the pivotal shift toward impulsivity, marked by phrases including "gets frustrated easily" (14 mentions), "starts bothering" (11 mentions), "escalates into conflicts" (9 mentions) and "drifts away fast" (8 mentions), where narratives portrayed attentional lapses as catalysts for peer provocation and cascading distractions, evident in sequential portrayals of instruction-following devolving into provocation (T09) or homework resistance spiralling into familial arguments (P21). These themes, emerging across 84% of interviews with greater parental emphasis possibly reflecting prolonged observational opportunities, not only corroborated the quantitative evidence of diminished sustained focus but also unveiled the temporal and relational dimensions of attentional constraint, suggesting that perpetration frequency may precipitate a cycle wherein fleeting attention fuels frustration, impulsivity and further aggression, thereby amplifying cognitive vulnerabilities in the ecologically demanding milieu of Bulawayo's urban ECD centres.

5.4 Reasoning Capacities in Preschool Aggressors Versus Peers

Reasoning capacity was evaluated through a composite score derived from three culturally adapted subtests of the WPPSI-IV (Block Design, Matrix Reasoning and Picture Concepts), standardised to a normative mean of 100 (SD = 15). In the sample of 148 learners (74 perpetrators and 74 non-perpetrators), the overall mean composite score was 92.60 (SD = 12.97).

Table 3: Descriptive Statistics for Reasoning Capacity Composite and Subtest Scores by Group

Measure	Perpetrators (n = 74) M (SD)	Non-Perpetrators (n = 74) M (SD)	Full Sample (n = 148) M (SD)
Composite Reasoning Score	88.42 (12.67)	96.78 (11.94)	92.60 (12.97)
Block Design (scaled score)	8.61 (2.84)	10.15 (2.61)	9.38 (2.84)
Matrix Reasoning (scaled score)	9.04 (2.92)	10.42 (2.78)	9.73 (2.91)
Picture Concepts (scaled score)	8.37 (3.01)	9.68 (2.89)	9.03 (3.03)

An independent-samples t-test confirmed a statistically significant difference in composite reasoning scores between groups, with perpetrators scoring lower (Cohen's d = 0.68, medium-to-large effect). Levene's test supported homogeneity of variance (p = 0.62) and normality assumptions held (Shapiro-Wilk p > 0.05 for both groups). Subsequent ANCOVA, adjusting for age, gender and socioeconomic status (proxied by centre type), maintained significance, indicating the group difference persisted independent of these covariates.

Figure 2: Inferential Findings: Independent-Samples t-test and ANCOVA for Composite Reasoning Score

Test	Statistic	df	p-value	Effect Size	95% CI for Mean Difference
Independent-samples t-test	t = -4.42	146	< 0.001	Cohen's d = 0.68	[-12.14, -4.58]
ANCOVA (controlling age, gender, SES)	F = 18.76	1,143	< 0.001	partial $\eta^2 = 0.12$	-

An independent-samples t-test confirmed a statistically significant difference in composite reasoning scores between groups (Cohen's d = 0.68, medium-to-large effect). Levene's test supported homogeneity of variance (p = .62) and normality assumptions held (Shapiro-Wilk p > 0.05 for both groups). ANCOVA, adjusting for age, gender and socioeconomic status (proxied by centre type), retained significance, indicating the group difference was independent of these covariates. These quantitative results demonstrated clear lower reasoning performance among perpetrators compared to peers, with consistent effect sizes across statistical approaches.

Extending the quantitative evidence of significantly reduced reasoning capacity in perpetrators (d = 0.68), thematic analysis of the 44 interviews uncovered two salient themes that elucidated stakeholders' observations of problem-solving and logical thinking deficits, with content analysis revealing recurrent lexical markers and narrative analysis highlighting sequential patterns of cognitive struggle.

Table 3.1: Thematic, Content and Narrative Analysis of Perceived Reasoning Difficulties

Theme/ Sub-Theme	**Description (Thematic Focus)**	**Frequently Captured Terms/Phrases (Content Analysis; Approximate Frequencies)**	**Example Narrative Excerpt (Narrative Analysis: Sequential Behaviour Description)**
Challenges in Problem-Solving and Logical Thinking	Tendency toward impulsive or aggressive solutions rather than reasoned approaches in conflicts or tasks	"Gets frustrated easily" (16 mentions), "impulsive" (14 mentions), "doesn't think ahead" (12 mentions), "knocks it down" (9 mentions)	*"In group play, when there's a conflict over toys, the ones who bully just grab or push instead of talking or waiting their turn; they don't seem to think ahead about consequences."* (T07)
- Impulsive Responses to Challenges	Rapid resort to physical or disruptive actions when faced with obstacles	"Just grab/push" (13 mentions), "gets angry quickly" (11 mentions), "no patience" (10 mentions)	*"She gets frustrated easily with simple tasks like building blocks; if it doesn't work immediately, she knocks it down rather than trying another way and then blames others."* (P19)
Limited Use of Alternative Strategies	Difficulty generating or persisting with flexible, non-aggressive solutions	"No other way" (12 mentions), "blames others" (10 mentions), "gives up fast" (9 mentions), "repeats the same mistake" (8 mentions)	*"When puzzles don't fit right away, he forces pieces or throws them, never stopping to rotate or try differently; it's always the same forceful approach."* (T14)
- Persistence with Ineffective Approaches	Repetitive reliance on failed or aggressive tactics without adaptation	"Forces pieces" (9 mentions), "repeats the same" (8 mentions), "throws/gives up" (7 mentions)	*"At home with games, if he loses, he flips the board instead of learning from it; next time, it's the same reaction all over again."* (P15)

The overarching theme of challenges in problem-solving and logical thinking emerged prominently (33 mentions across 80% of interviews), characterised by terms evoking frustration and impulsivity that aligned with the quantitative subtest deficits in fluid and visuospatial reasoning. Sub-themes delineated impulsive responses and limited strategic flexibility, with narratives tracing sequences from initial obstacle encounter to rapid escalation via aggression or abandonment, rather than iterative adjustment. Parental accounts contributed disproportionately to mentions of home-based persistence failures, possibly reflecting unobserved school behaviours, while teachers emphasised group contexts where ineffective strategies disrupted collective activities. These themes enriched the statistical group differences by portraying reasoning limitations as dynamic, contextually embedded processes wherein perpetrators appeared constrained in adaptive, prospective thinking, potentially perpetuating cycles of conflict in Bulawayo's resource-constrained ECD environments.

5.5 Educator and parental accounts on cognitive repercussions for young aggressors

The study explored stakeholders' observations of cognitive impacts among children identified as frequent perpetrators, building directly on the quantitative patterns of reduced attention ($r = -0.42$) and reasoning capacity ($d = 0.68$). Thematic analysis in NVivo (Version 14), following Braun and Clarke (2006), generated three principal themes that captured the perceived cognitive consequences, with content analysis quantifying salient lexical markers and narrative analysis tracing behavioural sequences. Inter-rater reliability for 20% of coded transcripts reached Cohen's kappa = 0.83.

Table 4: Thematic, Content and Narrative Analysis of Perceived Cognitive Repercussions

Theme/ Sub-Theme	**Description (Thematic Focus)**	**Frequently Captured Terms/Phrases**	**Example Narrative Excerpt (Narrative Analysis: Sequential Behaviour Description)**
Impaired Sustained Attention and Task Persistence	Difficulty maintaining focus across structured or play-based activities, leading to early disengagement	"Can't sit still" (19 mentions), "loses interest quickly" (17 mentions), "restless" (16 mentions), "wanders off" (11 mentions), "fidgeting" (9 mentions)	*"During story time he starts listening, but within minutes he's fidgeting, then wandering off to poke another child and soon the whole circle is disrupted."* (T04)
- Rapid Loss of Engagement	Quick shift from initial involvement to distraction or off-task behaviour	"Loses interest quickly" (17 mentions), "wanders off" (11 mentions), "drifts away" (10 mentions)	*"At home with a puzzle, he begins calmly, but after one or two pieces he loses interest, drifts away and starts bothering his brother instead."* (P14)
Reduced Problem-Solving Flexibility and Impulse Control	Preference for immediate, aggressive, or rigid responses over reasoned or adaptive strategies	"Gets frustrated easily" (18 mentions), "just grabs/pushes" (15 mentions), "doesn't think ahead" (13 mentions), "knocks it down" (10 mentions), "no patience" (9 mentions)	*"When toys are shared, he wants one now, so he grabs or pushes rather than waiting or asking; he never pauses to think of another way and it always ends in tears."* (T08)
- Impulsive or Rigid Responses to Obstacles	Reliance on physical force or abandonment when faced with difficulty	"Just grabs/pushes" (15 mentions), "knocks it down" (10 mentions), "gives up fast" (8 mentions)	*"If a block tower falls, she knocks the rest down in anger instead of rebuilding; next time it's the same reaction, no attempt to adjust."* (P20)
Limited Perspective-Taking and Social Reasoning	Difficulty recognising or anticipating others' emotions and intentions, contributing to relational aggression	"Doesn't realise how it hurts" (14 mentions), "laughs when they cry" (11 mentions), "doesn't see their feelings" (10 mentions), "no remorse" (8 mentions)	*"He excludes a child from play and laughs when they get upset; he seems unable to connect his action to their sadness, so it keeps happening."* (T12)

Theme 1 (Impaired Sustained Attention and Task Persistence [36 mentions, 82% of interviews]) emerged as the most salient, with content analysis revealing a cluster of terms denoting physical restlessness and mental drift. Narratives frequently depicted a temporal sequence: brief initial engagement → progressive disengagement → disruptive interference, mirroring the quantitative attention-span reduction and suggesting that perpetrators' cognitive resources may deplete rapidly under sustained demand.

Theme 2 (Reduced Problem-Solving Flexibility and Impulse Control [33 mentions, 75% of *interviews])* highlighted a marked preference for immediate, non-reflective responses. Stakeholders repeatedly described a behavioural cascade (encounter obstacle → frustration → rigid/aggressive action → failure to adapt) consistent with the WPPSI-IV subtest deficits in fluid and visuospatial reasoning and indicating constrained executive functioning in real-world problem contexts.

Theme 3 (Limited Perspective-Taking and Social Reasoning [29 mentions, 66% of interviews]) captured deficits in theory-of-mind-like capacities, with terms such as "doesn't realise how it hurts" and "no remorse" appearing frequently. Narratives portrayed a pattern of action → negative peer reaction → absence of emotional recognition → repetition, linking social-cognitive limitations to the perpetuation of relational aggression and aligning with the broader quantitative evidence of cognitive vulnerability.

Overall, these themes, with parental accounts contributing 58% of total mentions (possibly due to extended home observation), provided rich explanatory texture to the statistical findings, portraying cognitive repercussions as dynamic, contextually embedded processes wherein attentional lapses, impulsive responding and poor perspective-taking interact to sustain bullying cycles in Bulawayo's urban ECD settings.

5. Discussion

The findings of this study provide evidence that bullying perpetration among ECD learners in Bulawayo is associated with measurable cognitive difficulties, particularly in sustained attention and reasoning capacity. The moderate negative correlation between perpetration frequency and attention span duration ($r = -0.42$, $p < .001$, $r^2 = 0.176$) aligns with global literature linking repeated aggression to attentional erosion through stress-related pathways. García-Fernández *et al.* (2025) and Menken *et al.* (2022) reported similar patterns in older children, with perpetration frequency predicting metacognitive and attentional decrements of 0.03–0.05 SD, while Vaillancourt and Palamarchuk (2021) attributed such effects to sustained cortisol elevations disrupting prefrontal circuits. The present results extend these observations downward to preschool age and into a low-resource urban African context, where the observed slope (–0.135 min per frequency unit) and explained variance (17.4%) suggest that ecological stressors (overcrowding, limited individual attention and socioeconomic strain) may amplify the cognitive load of perpetration beyond what is documented in higher-resource settings.

The results provide support for the alternative hypothesis (H_1). The observed Pearson correlation between bullying perpetration frequency and attention span duration ($r = -0.42$, $p < 0.001$) exceeded the pre-specified threshold ($r < -0.3$) and led to rejection of the null hypothesis of no negative association ($r \geq 0$) at the 0.05 level. Likewise, perpetrators exhibited significantly lower composite reasoning scores than non-perpetrators ($t(146) = -4.42$, $p < 0.001$, $d = 0.68$), again rejecting the null of no group difference ($p \geq 0.05$). The medium-to-large effect size for reasoning ($d = 0.68$) and moderate explained variance for attention ($r^2 = 0.176$) indicate practically meaningful cognitive differences, consistent with global studies linking aggression to executive-function impairments (García-Fernández *et al.*, 2025; Menken *et al.*, 2022) and African evidence of socioeconomic mediation of such deficits (Juan *et al.*, 2025). These findings suggest that perpetration in resource-constrained ECD settings may impose a non-trivial cognitive burden on the aggressors themselves.

The significant deficit in composite reasoning performance among perpetrators ($t = -4.42$, $p < 0.001$, $d = 0.68$), persisting after covariate adjustment, mirrors global findings of impaired executive and social reasoning in aggressive children. Wang *et al.* (2024) documented 15–20% lower theory-of-mind scores in preschool physical bullies and García-Fernández *et al.* (2025) identified reduced elaboration and organisational skills in adolescent aggressors. African studies, including Okhotan *et al.* (2020) and Juan *et al.* (2025), have similarly linked perpetration to 20–30% lower problem-solving efficacy in primary learners, often mediated by poverty and communal stressors. The current study's effect size falls within this range and extends the evidence to Zimbabwean ECD, where qualitative accounts of impulsivity, rigidity and limited perspective-taking provide behavioural texture to the statistical deficits. These patterns support theoretical convergence around ecological (Bronfenbrenner, 1979) and sociocultural (Vygotsky, 1978) explanations, while highlighting the under-explored role of urban Zimbabwean macrosystem factors (rapid urbanisation, resource scarcity and shifting communal norms) in shaping perpetrator cognition.

Stakeholder narratives further illuminated these quantitative patterns, revealing perceived attentional lapses, impulsive problem-solving and poor social reasoning as interconnected processes that perpetuate bullying cycles. The dominance of terms such as "restless," "gets frustrated easily," and "doesn't think ahead" across 75–84% of interviews echoes global qualitative syntheses (Campbell *et al.*, 2019; Monks *et al.*, 2020) that document hidden cognitive strains in perpetrators, yet the temporal sequences described (brief engagement followed by disruption) suggest a more rapid depletion of cognitive resources than typically reported in Western samples. African and Zimbabwean literature (Muthevhuli and Obadire, 2021; Gomba and Zindonda, 2021) similarly notes emotional and contextual drivers of aggression, but rarely at preschool level. The present findings therefore bridge a critical gap by demonstrating that perpetrator-focused cognitive impacts are observable and meaningful in early childhood within resource-constrained urban African settings, where ubuntu principles of communal harmony appear strained by overcrowding and socioeconomic pressures.

While the study advances understanding of perpetrator cognition in ECD, several limitations temper the conclusions. The cross-sectional design precludes causal inference and teacher nominations may introduce selection bias, although multi-source verification and triangulation mitigated this risk. The sample, drawn from Bulawayo, may not fully generalise to rural or other urban Zimbabwean contexts. Nonetheless, the mixed-methods approach, cultural adaptation of instruments and high response rates strengthen the findings' credibility. Future longitudinal research could clarify directionality, while intervention studies might test whether attention and reasoning supports reduce perpetration in similar settings. Through documenting cognitive repercussions for young aggressors in an understudied African ECD context, this work contributes to a more balanced literature that moves beyond victim-centric perspectives and informs culturally responsive early prevention strategies.

7. Conclusion

This mixed-methods investigation has demonstrated that bullying perpetration among Early Childhood Development (ECD) learners in Bulawayo, Zimbabwe, is associated with discernible cognitive impairments, most notably in sustained attention and reasoning capacity. The quantitative results revealed a moderate inverse relationship between perpetration frequency and attention span duration ($r = -0.42$, $p < .001$, $r^2 = 0.176$), alongside a statistically and practically significant deficit in composite reasoning performance among identified perpetrators relative to non-perpetrators ($t(146) = -4.42$, $p < 0.001$, Cohen's $d = 0.68$), with the difference robust to adjustment for age, gender and socioeconomic proxies. These outcomes directly supported the alternative hypothesis (H_1): the observed correlation exceeded the pre-specified threshold ($r < -0.3$) and led to rejection of the null hypothesis of no negative association ($r \geq 0$), while the group difference in reasoning scores rejected the null of no difference ($p \geq 0.05$). The medium-to-large effect size for reasoning and moderate explained variance for attention indicate practically meaningful cognitive differences. Qualitative accounts from educators and parents further illuminated these patterns, consistently describing rapid disengagement, impulsive problem-solving, limited perspective-taking and behavioural sequences characterised by frustration-driven escalation rather than adaptive iteration. Taken together, the evidence positions perpetration not merely as a social-relational phenomenon but as a process that imposes measurable cognitive costs on the aggressors themselves.

These findings contribute to a growing, albeit still limited, body of perpetrator-focused research in early childhood. They align with international studies documenting attentional and executive-function decrements in aggressive children (García-Fernández *et al.*, 2025; Menken *et al.*, 2022; Wang *et al.*, 2024) and extend such observations into preschool age within a low-resource African urban context. The observed effect sizes and explained variance are broadly consistent with African primary-school studies reporting 15–30% performance gaps linked to aggression (Juan *et al.*, 2025; Muthevhuli and

Obadire, 2021), yet the present work is distinctive in its focus on ECD and its integration of stakeholder narratives that reveal the temporal and relational dynamics of cognitive strain. The recurring motif of brief engagement followed by disruption highlights the ecological interplay posited by Bronfenbrenner (1979) and the disrupted zone of proximal development conceptualised by Vygotsky (1978), while the qualitative emphasis on impulsivity and poor perspective-taking resonates with Piagetian accounts of preoperational egocentrism (1952) tempered by Bandura's social learning mechanisms (1977). In the Zimbabwean setting, these processes appear intensified by macrosystem stressors (overcrowding, resource scarcity and the tension between traditional ubuntu values and urban individualism) highlighting a culturally specific amplification of global patterns.

The practical implications are clear. ECD practitioners in Bulawayo and similar contexts would benefit from targeted professional development that equips them to identify and support cognitive vulnerabilities in young perpetrators, including structured attention-building activities and scaffolding of flexible problem-solving. Parental engagement programmes could address inadvertent reinforcement of impulsive strategies at home, while policy frameworks within the Ministry of Primary and Secondary Education might incorporate perpetrator-sensitive elements into national anti-bullying and child-development guidelines. Community-level interventions grounded in ubuntu principles (emphasising empathy, collective responsibility and restorative rather than punitive approaches) offer culturally congruent pathways to interrupt the observed cycles.

Notwithstanding these contributions, the study has limitations. The cross-sectional design precludes causal inference and teacher nominations may introduce selection bias, although triangulation and cultural adaptation of instruments provided safeguards. The sample, confined to Bulawayo, restricts generalisability to rural or other urban Zimbabwean settings. Future research should adopt longitudinal designs to establish temporal precedence and directionality, while experimental or quasi-experimental studies could evaluate whether targeted cognitive and behavioural supports mitigate perpetration and enhance developmental trajectories.

In sum, the present investigation demonstrates that early bullying perpetration carries non-trivial cognitive consequences for the aggressors, observable in both standardised performance and everyday stakeholder accounts. The rejection of the null hypotheses across both attention and reasoning domains highlights that perpetration in early childhood is not merely a behavioural issue but imposes measurable cognitive costs on the perpetrators themselves. Foregrounding the perpetrator perspective in an under-researched African ECD context, the study advances a more balanced scholarly discourse on childhood aggression and highlights the need for holistic, contextually responsive strategies that address the developmental needs of all children involved in bullying dynamics. Such an approach is essential if Zimbabwe's urban ECD programmes are to foster equitable cognitive and social growth amid contemporary socioeconomic challenges.

Conflict of Interest Statement
The author declares no conflict of interest. No funding was received for the conduct of this study or the preparation of this manuscript. The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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