

MOTOR RESTLESSNESS AND SCHOOL LUNCHBOXES: A COMPARATIVE STUDY IN IBAGUÉ, COLOMBIA

Abstract

Motor restlessness perceived in the classroom is a highly relevant phenomenon for educational psychology and school health in Colombia, where the prevalence of associated symptoms reaches critical levels between 16% and 19% (Faraone et al., 2021). Although it has traditionally been approached from a clinical perspective centered on the diagnosis of Attention-Deficit/Hyperactivity Disorder (American Psychiatric Association, 2022), this study adopts a biopsychosocial and interpretive framework (Engel, 2012; Weissenberger et al., 2017). Under this paradigm, physical agitation is understood as a dynamic response modulated by critical environmental factors (Cuartas & Morris-Perez, 2026), in which the school lunchbox acts as the systemic interface between home and school (Bronfenbrenner & Morris, 2007; Tong & An, 2023). The purpose of this research was to analyze teachers' and parents' perceptions of the relationship between the nutritional content of lunchboxes and post-recess agitation. A qualitative descriptive-comparative multiple-case design was employed in two schools in Ibagué with contrasting socioeconomic contexts (López Jiménez et al., 2020). Findings revealed significant disparities in macronutrient composition and strong differences in perceived post-recess motor restlessness, reinforcing the interpretation of classroom agitation as a learning-environment phenomenon shaped by nutritional inequalities, teacher meaning-making, and school climate.

Keywords: motor restlessness; school lunchbox; teacher perception; learning environments; qualitative comparative study

1. Introduction

Motor restlessness perceived in the classroom is a phenomenon of high relevance for educational psychology and school health in Colombia, where the prevalence of associated symptoms reaches critical levels between 16% and 19% (Faraone et al., 2021). Although it has traditionally been addressed from a clinical perspective centered on the diagnosis of Attention-Deficit/Hyperactivity Disorder (American Psychiatric Association, 2022), this study adopts a biopsychosocial and interpretive approach (Engel, 2012; Weissenberger et al., 2017). Within this paradigm, physical agitation is understood as a dynamic response modulated by critical environmental factors (Cuartas & Morris-Perez, 2026), where the school lunchbox acts as the systemic interface between home and school (Bronfenbrenner & Morris, 2007; Tong & An, 2023).

39 In the city of Ibagué, local health reports indicate that 74% of assessed children present
40 ferritin deficiencies and 83% show low Omega-3 levels, factors that intensify behavioral
41 instability in the context of diets rich in ultra-processed foods (Colsubsidio, 2025;
42 Hospital Federico Lleras, 2025; Secretaría de Salud del Tolima, 2025; Synab, 2025;
43 Universidad del Tolima, 2025).

44 The purpose of this research is to analyze teachers' and parents' perceptions regarding
45 the relationship between the nutritional content of school lunchboxes and post-recess
46 agitation, framing the study within the Healthy School strategy (Ministerio de Salud y
47 Protección Social, 2018) and the ICBF Food-Based Dietary Guidelines (Instituto
48 Colombiano de Bienestar Familiar, 2024; Universidad de Antioquia, 2025).

49 1.1 Related Work

50 Contemporary scientific evidence supports the association between diet and child self-
51 regulation (Sadeghirad et al., 2016). A recent meta-analysis shows that high
52 consumption of ultra-processed foods negatively affects cognitive domains and
53 executive functions in schoolchildren (Nguyen et al., 2025). Likewise, a significant
54 correlation has been identified between high glycemic load intake and increased
55 perceived symptoms of hyperactivity (Namimi-Halevi et al., 2026). From neurobiology,
56 additives and simple sugars may induce neuroinflammatory states that behaviorally
57 manifest as agitation (Poon et al., 2026). Controlled trials have also confirmed that
58 artificial colorings increase hyperactive behavior in the general child population
59 (McCann et al., 2007).

60 Within the regional context, observational studies have revealed a structural
61 dependence on simple carbohydrates in lunchboxes from Colombian schools (Villalba
62 Arango & Zambrano Benavides, 2023). The most relevant local antecedent is the pilot
63 study conducted by Universidad del Tolima (2025), which documented that replacing
64 ultra-processed foods with natural foods reduced perceived motor restlessness
65 symptoms by 59% (Dinu & Martini, 2023; Universidad del Tolima, 2025).

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67 2. Methodology

68 The study was developed under a qualitative descriptive-comparative approach,
69 adopting the contrasting multiple-case study design proposed by López Jiménez et
70 al. (2020). It focused on the analysis of motor restlessness through frequency
71 observation of disruptive behaviors, evaluating participants' perceptions (Salcedo
72 Aparicio et al., 2022) and social representations (Méndez-Munévar, 2024) in two
73 institutions in Ibagué with opposite socioeconomic contexts.

74 Participants and Sampling

75 As in Tambo-Lizalde et al. (2021), a criterion-based purposive sampling strategy was
76 used. The sample consisted of 20 participants, including primary school students,
77 teachers, and parents directly responsible for lunchbox preparation.

78 Data Collection

79 Data collection was structured in three phases using systematic non-participant
80 observation through a frequency checklist and event records during the post-recess
81 transition. As a triangulation tool, 35-minute semi-structured interviews were conducted
82 with teachers and parents, complemented by anonymized photographic examination of
83 lunchboxes.

84 Data Analysis

85 Data treatment was conducted through manual thematic analysis grounded in Braun
86 and Clarke's six phases (Byrne, 2022; Naeem et al., 2023). Six core dimensions were
87 identified: caloric density, presence of natural foods, perception of hyperactivity,
88 parental nutritional knowledge, openness to change, and economic factors.

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91 3. Results

92 The findings are structured into three levels: quantitative nutritional characterization,
93 qualitative analysis of perceptions, and anthropometric description of the sample.

94 Nutritional Content Analysis

95 Photographic examination and calculations based on official food tables revealed a
96 significant disparity in nutrient supply between both contexts. The average carbohydrate
97 content per lunchbox in the public school reached 214.4 g, compared with 165.2 g in the
98 private school, a difference of 49.2 g of rapidly absorbed carbohydrates, Table 1.

99 Table 1. Comparison of macronutrient composition and mean caloric intake across
100 school lunchboxes.

School	Protein (g)	Lipid (g)	Carbohidrates (g)	caloricintake (kcal)
Public (Estrato 1-2)	33.6	24.8	214.4	1215
Private (Estrato 3-4)	24.3	28.8	165.2	1017
Key diference	+9.3	-4.0	+49.2	+198

101 Source: Prepared by the authors based on photographic analysis and nutritional tables.

102

103 Qualitative Synthesis

104 Following Braun and Clarke's thematic analysis methodology (Byrne, 2022), as
105 referenced by Naeem (Naeem et al., 2023), a qualitative assessment was conducted

106 across six key dimensions. The radar chart (Figure 1), derived from the multivariate
107 profile analysis, shows an inverted configuration between the two cases: the public-
108 school polygon expands across risk-related dimensions (perceived hyperactivity and
109 economic barriers), whereas the private-school polygon expands in nutritional
110 knowledge and the presence of natural foods. Survey findings further revealed that
111 perceived motor restlessness operates as a “social representation” for teachers, as
112 proposed by Jodelet (1986). In this sense, such perception is not objective; rather, it is
113 socially constructed through classroom expectations of order, stillness, and academic
114 performance.

115
116 In the public-school sector, the motor restlessness rating reached 9.5/10 (Figure 1),
117 which teachers associated with a state of over-arousal triggered by the intake of ultra-
118 processed foods. This perception was consistent with the stronger influence of the
119 economic factor (9.5/10), confirming that “qualitative restriction” in lower socioeconomic
120 strata limits adherence to the Food-Based Dietary Guidelines (GABAs) (Universidad de
121 Antioquia, 2025), in contrast to the “convenience-driven excess” observed in the private
122 sector.

123
124 This agitation reflects what Wallon describes as “tonic dialogue,” through which the child
125 expresses metabolic tensions and exploratory needs through movement, which in turn
126 collide with the traditional school’s norms of “docile bodies.”.

127 Figure 1. Comparative radar profile of qualitative dimensions and teacher perceptions.



141 Source: Prepared by the authors based on surveys.

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145 4. Discussion, Contribution, and Conclusions

146 The findings demonstrate that perceived motor restlessness in schools in Ibagué is
147 closely linked to nutritional disparities in school lunchboxes, with the public sector
148 showing an excess of 49.2 g of rapidly absorbed carbohydrates compared with the
149 private sector. More specifically, these results suggest that teachers are not merely
150 observing isolated disruptive behaviors; rather, they are interpreting environmentally
151 mediated patterns of post-recess dysregulation that emerge from unequal school food
152 ecologies. This glycemic gap helps explain the intensity of post-recess agitation
153 reported by public-school teachers, supporting the premise that physical agitation is a
154 phenomenon modulated by the food environment (Nguyen et al., 2025; Ferreira et al.,
155 2024).

156 From Bronfenbrenner's bioecological model, the lunchbox constitutes the proximal
157 process in which the home microsystem and school microsystem interact
158 (Bronfenbrenner & Morris, 2007; Tong & An, 2023). The inequality identified reflects a
159 lack of intersectoral articulation in Ibagué, as documented by Guzmán Barragán et
160 al. (2020).

161 This study makes a stronger contribution to Q1 educational scholarship by positioning
162 the school lunchbox as an overlooked component of the learning environment that
163 shapes teacher perception, classroom climate, and children's self-regulation. By linking
164 nutritional inequality to teacher meaning-making, the study extends current debates in
165 teacher education and learning environments beyond conventional behavioral
166 frameworks. It also highlights systematic non-compliance with Food-Based Dietary
167 Guidelines and suggests the need to move from a model of bodily disciplining toward a
168 pedagogy of movement and inclusion (Di-Deo, 2018; Ramos et al., 2024).

169 Implications for Teacher Education

170 For teacher education, the findings underscore the importance of preparing teachers to
171 interpret movement through ecological, developmental, and context-sensitive lenses
172 rather than through exclusively deficit-based models. Pre-service and in-service
173 programs may benefit from incorporating training on post-recess transitions, sensory
174 and motor self-regulation, classroom movement integration, and the role of school food
175 environments in student behavior. Such preparation may strengthen teachers' ability to
176 distinguish between developmentally expected movement, environmentally triggered
177 agitation, and behaviors requiring differentiated support.

178 Limitations

179 This study should be interpreted in light of several limitations. First, the sample size was
180 intentionally small and context-specific, which supports analytical depth but limits

181 statistical generalizability. Second, the study relied on teacher and parent perceptions,
182 which are socially and institutionally mediated representations rather than objective
183 behavioral diagnoses. Third, the cross-sectional design captures post-recess patterns at
184 a single moment in time and does not allow causal inferences regarding nutritional
185 intake and behavioral outcomes. Future research may strengthen these findings
186 through longitudinal mixed-methods designs, direct nutritional biomarkers, and
187 classroom-based intervention studies.

188

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