



Iara Peixoto de Oliveira

**Disordered eating and insight in the
Brazilian high-risk cohort study for
mental conditions**

Dissertação de Mestrado

Dissertation presented to the Programa de Pós-Graduação em Psicologia of PUC-RIO in partial fulfillment of the requirements for the degree of Master em Psicologia.

Advisor: Prof. Daniel Corrêa Mograbi

Co-advisor: Patrícia P. Bado

Rio de Janeiro,
March 2025.



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Abstract

Oliveira, Iara Peixoto de; Mograbi, Daniel Correa (Advisor). **Disordered Eating and Insight Level in the Brazilian High-Risk Cohort Study for Mental Conditions.** Rio de Janeiro, 2025. 66 p. Dissertação de Mestrado – Departamento de Psicologia, Pontifícia Universidade Católica do Rio de Janeiro.

Objective: Research shows that most mental disorders emerge during childhood and adolescence, significantly affecting quality of life. Various factors can influence how these conditions develop over time. This study examines the relationship between Disordered Eating Behaviors (DEB) and psychopathologies, while also exploring the potential association between insight levels and mental health conditions. More broadly, it aims to outline the profile of these issues and their associated factors in Brazilian children and adolescents. **Methods:** The sample consisted of participants from the Brazilian High-Risk Cohort for Mental Conditions, with data collected at multiple time points, including baseline in 2010 and follow-ups at three and six years. The study utilized assessments such as the Development and Well-Being Assessment (DAWBA), the Child Behavior Checklist (CBCL), and the Applause Questionnaire. **Results:** Findings reveal the prevalence of DEB, its trajectory over time, and its associations with psychopathologies. Additionally, the study classifies individuals into impaired and preserved insight groups, analyzing their associations with diagnoses and symptoms. Life factors were analyzed separately for DEB and insight, though no direct correlation between them was established. **Conclusions:** This study contributes to a better understanding of DEB and insight in Brazilian children and adolescents, highlighting their associations with mental health conditions. The findings reinforce the need for early identification and intervention, particularly in non-clinical populations. Expanding mental health care access and preventive measures, such as school-based programs, may help mitigate the burden of mental health issues.

Keywords

Disordered Eating Behaviors; Insight; Psychopathology; Children; Adolescents.

Resumo

Oliveira, Iara Peixoto de; Mograbi, Daniel Correa. **Comer Transtornado e Nível de Insight na Coorte Brasileira de Alto Risco para Transtornos Mentais**. Rio de Janeiro, 2025. 66 p. Dissertação de Mestrado – Departamento de Psicologia, Pontifícia Universidade Católica do Rio de Janeiro.

Objetivo: Estudos indicam que a maioria dos transtornos mentais surge na infância e adolescência, impactando significativamente a qualidade de vida. Diversos fatores podem influenciar o desenvolvimento dessas condições ao longo do tempo. Este estudo investiga a relação entre Comer Transtornado (CT) e psicopatologias, além de explorar a possível associação entre níveis de insight e problemas de saúde mental. De forma mais ampla, tem como objetivo identificar o perfil desses problemas e fatores associados em crianças e adolescentes brasileiros. **Métodos:** A amostra inclui participantes da Coorte Brasileira de Alto Risco para Transtornos Mentais, com dados coletados em diferentes ondas, incluindo a coleta inicial em 2010 e acompanhamentos após três e seis anos. Os seguintes instrumentos foram utilizados: Development and Well-Being Assessment (DAWBA), o Child Behavior Checklist (CBCL) e o Questionário Applause. **Resultados:** É apresentada a prevalência de CT, sua trajetória ao longo do tempo e suas associações com psicopatologias. O estudo também classifica os indivíduos em grupos de insight prejudicado e preservado, analisando associações com diagnósticos e sintomas. Alguns fatores de vida foram analisados separadamente para CT e insight, embora nenhuma correlação direta entre eles tenha sido estabelecida. **Conclusões:** Este estudo contribui para ampliar a compreensão sobre CT e insight em crianças e adolescentes brasileiros, destacando suas associações com condições de saúde mental. Os resultados reforçam a necessidade de identificação e intervenção precoces, especialmente em populações não clínicas. A ampliação do acesso aos cuidados em saúde mental e a implementação de medidas preventivas, como programas escolares, podem ajudar a reduzir o impacto desses problemas.

Palavras-Chave

Comer Transtornado; Insight; Psicopatologia; Crianças; Adolescentes.

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1 INTRODUCTION

1.1 MENTAL HEALTH IN CHILDREN AND ADOLESCENTS

Mental health is related to a state of well-being in which individuals can cope with life's challenges, encompassing cognitive, behavioral, and social functioning (Galderisi et al., 2015). According to the World Health Organization (WHO, 2022), it is a complex concept that extends beyond the absence of illness, existing on a continuum where people experience different levels of psychological well-being throughout life. Mental health can be influenced by biological, psychological, and environmental factors, making it a critical component of overall health and human development (Patel et al., 2018).

The prevalence of mental disorders has been widely studied in Brazil and around the world, showing a growing number of cases. In response, more initiatives are reassessing the current approach to treatment and prevention (World Health Organization, 2022). This concern is particularly alarming in children and adolescents, as most mental health conditions emerge during early life stages (Guthold et al., 2023; Kessler et al., 2005). Adverse experiences, such as childhood trauma, social exclusion, and economic instability, can increase the risk of mental health issues (Gajos et al., 2022; Lund et al., 2018; Zhang et al., 2023). On the other hand, protective factors, including strong social connections, access to education, and supportive environments, contribute to resilience (Bethell et al., 2019; Qu et al., 2022; Samji et al., 2024).

According to the National Healthcare Quality and Disparities Report, in the United States, approximately 20% of children and adolescents aged 3 to 17 experience mental, emotional, developmental, or behavioral disorders (Agency for Healthcare Research and Quality, 2022). The World Health Organization (2022) reports that approximately one in seven adolescents experience a mental disorder, with anxiety and depression being the most prevalent. A comprehensive meta-analysis, including 41 studies across 27 countries, found a combined global prevalence of 13.4% for mental disorders in children and adolescents (Polanczyk

et al., 2015). Other studies also highlight the high prevalence of mental health disorders in this age group, with some indicating even higher rates among girls and older adolescents (Erskine et al., 2017; Lopes et al., 2016; Mohammadi et al., 2019; Sacco et al., 2024). Despite mental health conditions mental disorders affect a significant number of children and adolescents worldwide, they are still often untreated (Radez et al., 2021). In Brazil, it is estimated that around 80% of children and adolescents with mental health problems don't receive any assistance (Fatori et al., 2019)

Untreated mental health issues during childhood and adolescence can lead to long-term consequences, including psychological distress, lower life satisfaction and reduced well-being, impaired academic achievement, lower quality of social relationships, and other problems (Chervonsky & Hunt, 2019; Dalsgaard et al., 2020; Pagerols et al., 2022). Besides these effects, there is also an impact on the costs of healthcare systems (Cawthorpe et al., 2011; Sporinova et al., 2019). This indicates a need to address mental health problems at an early stage to prevent further worsening of these problems.

1.2 DISORDERED EATING AND MENTAL HEALTH

Eating is not merely an act intended to satisfy biological needs; it also involves psychological and social aspects (Berthoud et al., 2011; Lowe et al., 2007). Although eating is essential for survival, in some cases there are disturbances in eating patterns that can be referred to as disordered eating behaviors (DEB) or classified as eating disorders (EDs). In addition, an increase in the incidence of overweight and obesity has been reported both in Brazil and worldwide, often linked to various medical conditions, including cardiovascular diseases, metabolic disorders, and mental health problems (Costa & Dassi, 2019). This highlights the importance of expanding our understanding of eating-related problems.

Several studies have explored the prevalence of eating disorders (EDs) and their significant impact on those affected (Hay et al., 2023; Santomauro et al., 2021). However, a portion of the population experiences eating-related problems

without meeting the criteria for EDs, despite experiencing significant psychological distress, which can be classified as DEB. Both conditions are characterized by difficulties in eating behaviors, with negative impacts on physical, psychological, and social domains. While there is no clear threshold between the two, they are commonly distinguished by the frequency and intensity of these behaviors and symptoms (Crejo & Mathias, 2021; Thomas et al., 2021)

The definition of DEB in the literature remains not fully delineated, but it is generally associated with dysfunctional attitudes toward eating. These behaviors include dieting, restriction and/or binge eating, skipping meals, inducing vomiting, using laxatives or diuretics, avoiding certain food groups, excessive physical exercise, among others (Crejo & Mathias, 2021; Reba-Harrelson et al., 2009; Thomas et al., 2021)

The prevalence of DEB has been assessed in some studies in Brazil and worldwide. A recent systematic review, which included 32 studies from 16 countries, mostly from high-income communities, reported a global prevalence of 22.36% of DEB among children and adolescents (López-Gil et al., 2023). In a German study, Herpertz-Dahlmann and colleagues (2008) evaluated the presence of DEB in a sample of adolescents (ages 11-17) and found its incidence in approximately one-third of girls and 15% of boys. A study in Greece, involving a sample of young adult women (ages 18-24), found a DEB incidence of 18% (Vlachakis & Vlachakis, 2014).

In Brazil, one study found a 17.3% prevalence of DEB in adolescents aged 13 to 19 (Leal et al., 2020). Another study found a prevalence of 21.7% in girls aged 12 to 16 (Fortes et al., 2014). Other research has identified prevalence rates for specific behaviors related to DEB (De Souza Ferreira & Da Veiga, 2008; Ferreira et al., 2013; Nunes et al., 2003). Additionally, studies in adults have shown that DEB is highly prevalent in this population (De Matos et al., 2021; Gauvin et al., 2009; Vlachakis & Vlachakis, 2014). Despite the available data, it is important to note that most research on DEB has focused on specific demographic groups, limiting the generalizability of these findings. For example, many studies have concentrated solely on women (Nunes et al., 2003; Reba-Harrelson et al., 2009), specific socioeconomic backgrounds (De Souza

Ferreira & Da Veiga, 2008), and university students (De Matos et al., 2021; Yu et al., 2015). Also, most research on this topic has been conducted as cross-sectional studies, with longitudinal studies still limited (Leal et al., 2013). Therefore, there is a need for more community-based studies, as population-based research can minimize participant selection bias and yield more representative data.

DEB directly affects daily life, as food and body concerns become persistent. (Aparicio-Martinez et al., 2019; Crejo & Mathias, 2021). DEB has also been associated with various physical and psychological health impairments, which consequently affect quality of life. One study found an association between DEB at age 24 and psychological distress in both sexes 10 years later (Kärkkäinen et al., 2018). Herle and colleagues (2020) report that excessive eating in childhood was associated with an increased risk of binge eating disorder (BED) in adolescence; meanwhile, restricted eating was linked to a higher risk of Anorexia Nervosa (AN) in girls, and a demanding eating pattern (e.g., eating only specific foods) was associated with an increased risk of AN in both sexes. Additionally, DEB has been linked to higher body mass index (BMI, Kärkkäinen et al., 2018; Santana et al., 2017) and may have negative impacts on physical health (Patrick et al., 2011).

DE has also been associated with certain psychopathologies, notably internalizing disorders such as anxiety and depression. One study demonstrated a mutual correlation between the occurrence of DEB, EDs and depressive symptoms, indicating that both act as risk factors for each other (Puccio et al., 2017). Associations between DE, anxiety, and depression have also been reported in preadolescents, highlighting the importance of developing longitudinal studies that can track the progression of these problems and their associations (Thomas et al., 2021). There is limited evidence regarding the relationship between DEB and externalizing disorders. One study found a weak association between the two (Slane et al., 2010). A few other specific diagnoses have also been studied, but research in this area remains limited.

1.3 INSIGHT AND MENTAL HEALTH

Insight is a fundamental concept in psychiatry, referring to an individual's ability to recognize and understand their own psychological state and can vary in different degrees, from a complete lack of awareness to a full understanding of the disease and the need for treatment (Lewis, 1934; Mograbi & Morris, 2018). This includes awareness of symptoms, the ability to attribute them to a specific mental health condition, and the recognition of the need for treatment (Cooke et al., 2010; Marková & Berrios, 1992; Parellada et al., 2009).

Insight is influenced by various factors, including neurocognitive (Pruß et al., 2012), psychological (Lysaker et al., 2003), and social aspects (Macgregor et al., 2015; Pruß et al., 2012). A significant factor is the gravity of the mental health condition itself. Individuals with severe psychiatric disorders, such as schizophrenia or bipolar disorder, often suffer from impaired insight due to cognitive and perceptual disturbances that make it difficult to recognize their illness (Camelo et al., 2019; Lysaker et al., 2018; Mutsatsa et al., 2006). The level of insight plays an important role in clinical condition, treatment adherence, and prognosis (Marková & Berrios, 2011).

Impaired insight is associated with resistance to treatment, poorer clinical outcomes, and impaired social functioning (Lincoln et al., 2016; Misdrahi et al., 2016). On the other hand, preserved insight can enable individuals to engage more effectively in treatment and adopt adaptive coping strategies (Marková & Berrios, 2011). However, research has shown a contradictory effect in which increased insight can sometimes lead to higher levels of distress, self-stigma and depressive symptoms (García-Mieres et al., 2020; Lysaker et al., 2018).

The degree of insight varies significantly across different psychiatric disorders. In schizophrenia, impaired insight is a core feature and patients often fail to recognize their delusions and hallucinations as pathological, which contributes to poor medication adherence and increased relapse rates (Lysaker et al., 2003; Misdrahi et al., 2016). Similarly, in bipolar disorder, insight fluctuates depending on mood state; individuals in manic episodes tend to have lower insight, whereas those in depressive states may exhibit higher awareness but also heightened self-stigma and hopelessness (Silva et al., 2015).

In obsessive-compulsive disorder (OCD), while individuals with OCD

typically recognize their obsessions and compulsions as excessive or irrational, a subset of patients—particularly those with poor insight—believe their compulsions are justified, leading to greater resistance to therapy (Gan et al., 2022; Lewin et al., 2010). In major depressive disorder (MDD), high levels of insight are associated with greater distress and self-criticism (Lee et al., 2010).

In children and adolescents, this literature remains limited. Individuals at this age may not have the cognitive maturity necessary to gain a broad understanding of their mental health problems and may have difficulty articulating their internal experiences and recognizing patterns in their thoughts and behaviors (Nikolajsen et al., 2011). Some studies have explored this issue in children and adolescents within specific disorders, such as schizophrenia (Parellada et al., 2009) and OCD (Adelman & Lebowitz, 2012), and the results of insight patterns have been in line with those observed in adults. However, the long-term consequences of this issue early in life are unknown. Therefore, more research is needed to better understand insight in younger populations and its implications for mental health outcomes.

1.4 THE BRAZILIAN HIGH-RISK COHORT FOR MENTAL CONDITIONS

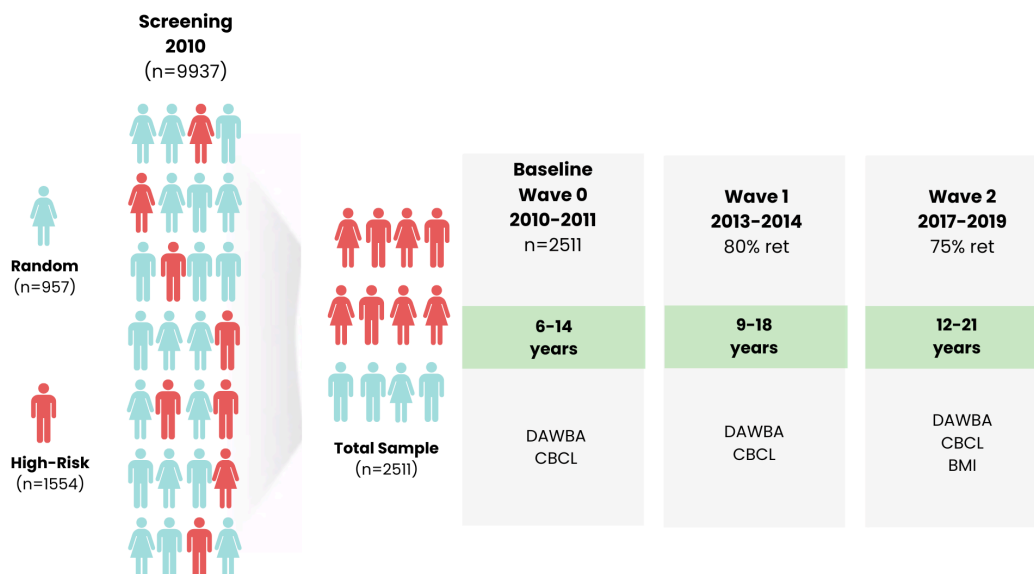
Both studies presented here were conducted with data from the Brazilian High-Risk Cohort Study for Childhood Psychiatric Disorders (BHRC, Salum et al., 2015), conducted by the National Institute of Developmental Psychiatry (INPD). The BHRC investigates typical and atypical trajectories of psychopathology and cognition (<https://inpd.org.br/pesquisa-conexao/>). Clinical and behavioral assessment questionnaires were employed to examine mental health data, complemented by additional instruments for neuroimaging and genetic investigations. Detailed protocols and further information about the study are available on the Open Science Framework (<https://osf.io/ktz5h>).

In the BHRC, children and adolescents from 57 schools in Porto Alegre and São Paulo were selected based on two groups: a high-risk group (N=1,553) comprising individuals with a family history of mental health issues, and a random group (N=958) consisting of individuals without such family history. This

is a longitudinal study, with three assessment stages completed to date, as shown in Figure 1. A more detailed description of the study sample can be found in Salum and collaborators (2015).

Figure 1

Sample characteristics and collected instruments in the Brazilian High-Risk Cohort Study for Mental Conditions.



Legend: BMI = body mass index; CBCL = Child Behavior Checklist; DAWBA = Development and Well-Being Assessment; ret = retention.

1.5 OBJECTIVE

These studies aimed to investigate the relationship between Disordered Eating Behaviors and psychopathologies (study 1), in addition to exploring how the level of insight may be associated with these mental health conditions (study 2) in a population sample of children and adolescents. Individual studies were carried out with the following specific objectives:

Study 1 – This study aims to investigate the developmental trajectory and psychopathological correlates of Disordered Eating Behaviors in children and adolescents in Brazil.

Study 2 – This study aims to investigate insight within a population-based sample of children and adolescents in Brazil.

2 ARTICLE SECTION

2.1 ARTICLE 1

de Oliveira IP, Fernández AC, Salum GA, Gadelha A, Pan PM, Miguel EC, et al. Longitudinal patterns of disordered eating behaviors in children and adolescents from the Brazilian High-Risk Cohort study for mental conditions. *Braz J Psychiatry*. 2025;47:e20243867. <http://doi.org/10.47626/1516-4446-2024-3867>



ORIGINAL ARTICLE

Longitudinal patterns of disordered eating behaviors in children and adolescents from the Brazilian High-Risk Cohort study for mental conditions

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Objective: Disordered eating behaviors (DEB) are dysfunctional changes in eating behavior that do not meet the diagnostic criteria for eating disorders. DEB affect a significant percentage of individuals, yet the topic remains under-researched. The current study investigates the developmental trajectory and psychopathological correlates of DEB in children and adolescents in Brazil.

Methods: The sample included 1,583 participants from the Brazilian High-Risk Cohort who were assessed across three waves between 2010 (age 6-12 years) and 2019 (age 12-21 years). Psychopathology was assessed through the Development and Well-Being Assessment, and DEB was assessed through Development and Well-Being Assessment's eating disorder section. Dimensional psychopathology was measured with the Child Behavior Checklist.

Results: The participants were divided into dysfunctional and non-dysfunctional eating groups. DEB varied significantly, with few participants having a persistent pattern. DEB were strongly linked to higher internalizing symptoms, especially in girls, but less to externalizing behaviors. DEB increased the likelihood of eating disorders, major depressive disorder, and higher body mass index.

Conclusion: This study reveals that DEB are frequent among Brazilian children and adolescents and are linked to psychopathology (especially internalizing symptoms) and body mass index. Future research should investigate the underlying mechanisms of DEB and develop strategies for early detection and effective interventions.

Keywords: Disordered eating behaviors; psychopathology; internalizing problems; body mass index

Introduction

Disordered eating behaviors (DEB) include dieting, binge eating, meal skipping, vomiting, and laxative use.¹⁻⁴ While the terminology varies, DEB commonly refers to problematic eating habits. DEB are less frequent and severe than eating disorders (ED) and do not meet the diagnostic criteria for ED.^{2,4} However, given the potentially life-threatening nature of ED and the significant association between early childhood eating difficulties and ED,⁵ the importance of studying DEB is clear.

DEB can also be useful transdiagnostically, since they identify overlapping symptoms across various ED, thus addressing frequent diagnostic crossover.^{6,7} This can lead to more comprehensive interventions, better treatment outcomes, and prevent DEB from escalating into full-syndrome ED. Understanding the frequency and

consequences of DEB is also important to educate adolescents and families about the risks associated with these behaviors, their long-term effects, and other comorbid problems.⁸

A recent systematic review⁹ found a 22.36% global prevalence of DEB in children and adolescents. Several Brazilian studies have explored DEB. One study⁹ found a 17.3% DEB prevalence in adolescents aged 13 to 19, while another study¹⁰ found a 21.7% prevalence for girls aged 12-16 years. Ferreira and Veiga¹¹ reported a 37.3% prevalence of binge eating and 24.7% prevalence of strict dieting in this population. In women aged 12-29 years, Nunes et al.⁸ found that 10.9% of the total sample had abnormal eating behaviors and 23.8% reported unusual eating patterns. Furthermore, a study¹² found binge eating in 20% and 8.4% of adolescents and adults, respectively; strict dieting or fasting in 18.9 and 2.4% of

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adolescents and adults, respectively; and purging in 3.3 and 2.2% in adolescents and adults, respectively. Research has shown that DEB are also highly prevalent in adults, typically ranging from 10% to 25%.¹³⁻¹⁶ However, it is important to note that most research on DEB has focused on specific demographic groups, such as individuals of particular socioeconomic backgrounds,¹¹ women,^{3,8,14} and university students,^{13,17,18} indicating that more community-based studies are needed.

The literature also shows a strong relationship between DEB and internalizing (emotional) symptoms^{4,19} and diagnoses related to this dimension, such as ED,^{5,20} depression,^{10,21,22} and anxiety.⁴ DEB have also been linked to higher body mass index (BMI),^{12,23-25} indicating potential negative impacts on physical health.²⁶ No significant correlations have been found between DEB and externalizing (behavioral) symptoms in general, though sex differences may influence this relationship.²⁷ Specifically, attention-deficit/hyperactivity disorder (ADHD) inattentive and impulsive symptoms have consistently predicted subclinical ED symptoms, mainly those associated with addictive eating behavior, while findings regarding hyperactivity symptoms vary.^{28,29}

Culbert et al.³⁰ point out that the disproportionate focus on women and girls in DEB research overlooks its impact on men and boys, as well as and potential sex differences in prevalence and trajectory. Longitudinal studies beginning in pre-adolescence that involve high-risk groups, including comprehensive assessment of biological, psychological, and behavioral indicators, are needed to determine risk factors, developmental trajectories, and sex differences in DEB.²⁶ A population-based Brazilian cross-sectional study²³ conducted over 5 years found temporal changes in DEB prevalence, including a significant increase in binge eating (18.4%) but only slight variations in other DEB.

More research on early DEB development is needed, since most mental health issues begin in childhood and adolescence.^{31,32} The relationship between DEB and psychopathological symptoms during development is unclear, with research mainly focusing on young adults rather than early developmental stages. Furthermore, most longitudinal studies on children and adolescents with community samples come from high-income countries,³³ highlighting the critical need for more research from low- and middle-income countries. In this context, our study aims to investigate the frequency, psychopathological correlates, and trajectory of DEB in children and adolescents in a longitudinal community sample from Brazil. Based on the literature, we expected to find an association between DEB and internalizing symptoms, a higher frequency among girls, and an association with high BMI. A deeper understanding of this topic is crucial for developing targeted early interventions, which could significantly reduce the long-term impact of DEB on mental health and quality of life.

Methods

This project is based on the Brazilian High Risk Cohort Study for Mental Conditions.³⁴ Complete protocols and

additional information about the study are available in the Open Science Framework (<https://osf.io/ktz5h>).

Sample characteristics

Children and adolescents from 57 schools in Porto Alegre, Rio Grande do Sul and São Paulo, São Paulo were screened, resulting in a representative sample of 2,511 participants: a high-risk group with a family history of mental health issues (n=1,553) and a random group with no history of mental health issues (n=958). So far, the Brazilian High Risk Cohort Study for Mental Condition has completed three assessment stages: baseline (w0; 2010-2011, ages 6-14), the 3-year follow-up (w1; 2013-2014, ages 9-17), and the 6-year follow-up (2017-2019, ages 12-21). Figure 1 illustrates the sample and data collection procedures over time. A more detailed description of the sample is provided in Salum et al.³⁴

Procedures

The Development and Well-Being Assessment (DAWBA),³⁵ which includes both structured and open-ended questions, was used to determine whether the participants met DSM-IV diagnostic criteria. Trained interviewers conducted structured interviews with caregivers, and all diagnoses were subsequently reviewed by psychiatrists.³⁴ This assessment was repeated at the 3- and 6-year follow-up, as shown in Figure 1. In the same protocol, the Child Behavior Checklist (CBCL)³⁶ was applied to assess behavioral problems and emotional aspects. At the 6-year follow-up, diagnostic interviews were conducted with caregivers for participants younger than 18 years of age and with the participants themselves if they were over 18 years of age (n=585). Caregivers and cohort participants were interviewed according to the Brazilian High Risk Cohort Study for Mental Condition study protocol to gather additional information on child and family demographics, medical history, academic performance, and major life events.³⁴ Participant BMI was calculated for the 6-year follow-up based on measurements taken during the data collection visit.

Measurements

Disordered eating behaviors and psychiatric diagnoses

We used the DAWBA³⁵ to determine mental health diagnoses. The DAWBA ED section was used to assess DEB in our study. These items have been validated and show strong psychometric properties, making them suitable for assessing ED in both clinical and epidemiological contexts.^{37,38} Given the lack of standardized instruments for evaluating DEB and the overlap between DEB and ED, we selected this instrument for our research. It consists of five yes/no questions: i) Has [Name] ever thought he/she was fat, even when people told him/her that he/she was too thin?; ii) Would [Name] be embarrassed if people knew how much he/she eats?; iii) Has [Name] ever vomited on purpose?; iv) Does deciding what to eat, where to eat, or how much to eat get

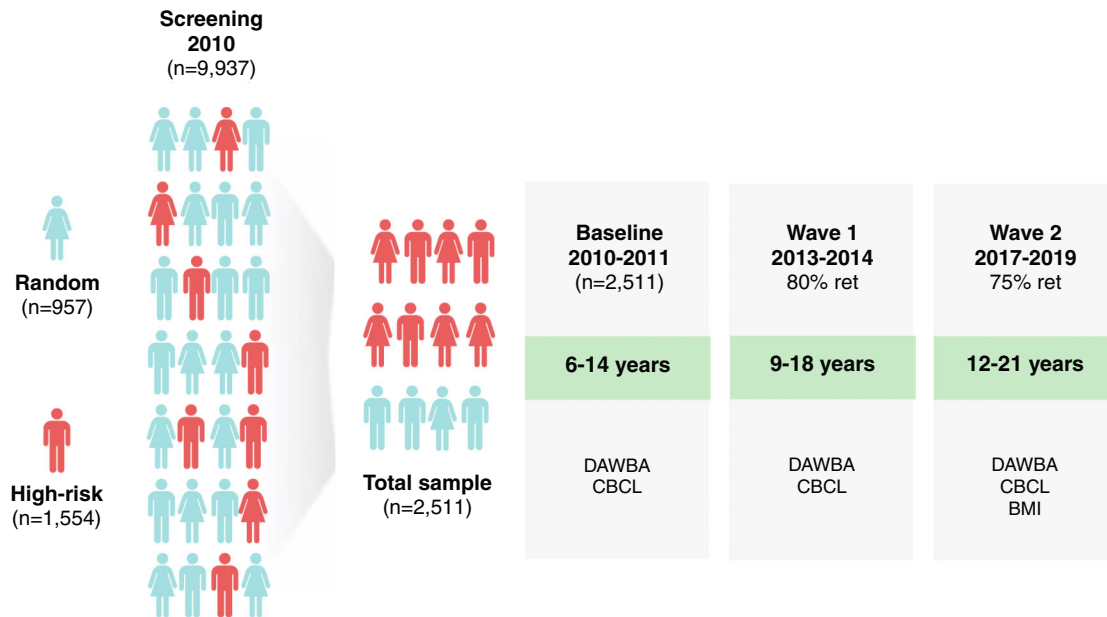


Figure 1 Sample characteristics and collected instruments in the Brazilian High Risk Cohort Study for Mental Conditions. BMI = body mass index; CBCL = Child Behavior Checklist; DAWBA = Development and Well-Being Assessment; ret = retention.

in the way of his/her life?; v) If [Name] eats too much, does he/she blame him/herself a lot?).

Dimensional psychopathology

The CBCL³⁶ assesses emotional and behavioral problems in children and adolescents through 113 items scored on a three-point Likert scale (0 = never, 1 = sometimes, 2 = often). It covers a range of issues, including aggressive behaviors, anxiety/depression, attention problems, delinquent behavior, social difficulties, somatic complaints, thought problems, and withdrawal. The CBCL differentiates between internalizing factors (emotional difficulties) and externalizing factors (outwardly expressed behaviors), providing an overall score. In this study, the CBCL was used to examine mental health concerns and their associations with DEB, extending beyond a diagnosis-only approach.

Statistical analysis

DEB were assessed using the five initial screening questions of the DAWBA ED section. Confirmatory factor analysis with diagonally weighted least squares and nonlinear least squares was performed to evaluate model fit. A 5-item latent class analysis was conducted to identify distinct groups based on DEB patterns. Models ranging from 1 to 6 classes were evaluated using the Bayesian information criterion, the sample-size adjusted Bayesian information criterion, and the consistent Akaike information criterion. Based on this, the frequency of DEB was assessed in each wave and cumulatively, representing the proportion of individuals with DEB during the follow-up

period. Additionally, logistic regression was used to examine risk factors for DEB, such as age, sex, and socioeconomic status (SES).

The developmental trajectory of DEB was investigated to determine its different patterns over time, and four subgroups were delineated. The incident group consisted of individuals with no DEB at baseline (w0) who developed them later (at w1 and/or w2). The remittent group includes those who initially experienced DEB (at w0 and/or w1) but not in subsequent assessments (at w1 and/or w2). The transient group consisted of individuals who had DEB at baseline (w0), did not have them at the 3-year follow-up (w1), and then experienced a recurrence by the 6-year follow-up (w2). This group also includes those without signs of DEB at baseline, with signs at the 3-year follow-up, and without signs at the 6-year follow-up. Finally, the persistent group included individuals with consistent DEB in each wave (w0, w1, and w2).

We assessed the frequency of diagnoses commonly associated with eating problems in the current literature: ED,^{5,20} generalized anxiety disorder,⁴ major depressive disorder,^{10,21} and ADHD.^{28,29} Logistic regression was used to investigate the association between DEB and diagnoses, controlling for age, sex, and SES. To assess psychopathology dimensionally, we used the CBCL, focusing on the dimensions of internalizing, externalizing, attention, and total problems, considering DEB group (DEB or non-DEB) and subgroups (incident, remittent, transient, and persistent). Mixed-design analysis of variance was used to examine the influence of DEB on psychopathology symptoms, considering the effect of time and potential interactions between factors. This was

followed by linear regression analyses to further determine the impact of DEB on psychopathology symptoms and BMI, controlling for age, sex, and SES. Statistical analyses were conducted in R-Studio 4.3.2.

This project was approved by the ethics committees of the Universidade de São Paulo, the Universidade Federal do Rio Grande do Sul, and other local institutions that participated in the data collection. Written informed consent was obtained from all participants and their caregivers.

Results

Estimation and classification of disordered eating behaviors

Confirmatory factor analysis indicated a well-fitting model, as demonstrated by a non-significant chi-square test ($\chi^2 = 6.577$, $p = 0.254$). Standardized loadings for the latent construct of DEB were significant ($p < 0.001$), ranging from 0.510 to 0.878, indicating a strong association. The alpha coefficient of 0.853 suggested strong internal consistency among the observed variables of the DEB construct, confirming its high reliability. The omega coefficient ($\omega = 0.669$) indicated a moderate level of internal consistency. Model fit indices further supported the model's adequacy, with a comparative fit index of 0.998, a Tucker-Lewis index of 0.997, and a root mean square error of approximation of 0.015. These findings suggest that the model satisfactorily fit the observed data, supporting the validity of the theoretical structure of DEB in this study. Details about the response distribution are shown in Supplementary Table S1.

DEB groups were subsequently classified using latent class analysis, with models 2 to 6 meeting the statistical criteria. The representativeness of different class numbers was assessed, revealing that many classes did not adequately encompass a significant percentage of individuals. These findings suggest that Model 2, which had fewer classes, effectively represented the data (Bayesian information criterion = 6520.217, sample-size adjusted Bayesian information criterion = 6485.267, consistent Akaike information criterion = 6531.217) while avoiding unnecessary complexity. Participants were categorized into a dysfunctional group (DEB group, $n = 301$, ~14%) and a non-dysfunctional group (non-DEB group, $n = 2,210$, ~86%). This model also showed a good fit in the subsequent waves (w1 and w2), in which latent class analysis was also applied.

Frequency of and risk factors for disordered eating behaviors

DEB frequency and sociodemographic information is detailed in Table 1 for baseline and the 3-year and 6-year follow-ups.

Logistic regression analysis showed that age, sex, and SES were significant risk factors for DEB. The adjusted odds ratio (OR) for age was 1.10 (95%CI 1.03-1.16, $p = 0.004$), indicating a 10% increase in DEB risk per year. The OR for girls was 2.38 (95%CI 1.81-3.13, $p < 0.001$), meaning they are 2.38 times more likely to develop DEB than boys. Lower SES was linked to an increased DEB risk, with an OR of 0.97 (95%CI 0.93-1.01, $p = 0.029$), reflecting a 3% reduction in risk per unit increase in SES.

Developmental trajectory of disordered eating behaviors

The developmental trajectory of DEB was examined based on its presence or absence over time across three waves according to the latent class analysis. The analysis included a subsample of individuals with valid DEB data from the DAWBA items across all waves ($n=1,583$). Four subgroups were formed based on the longitudinal impact of DEB: incident ($n=130$, 8.2%; 91 girls, 70%), remittent ($n=131$, 8.3%; 78 girls, 59.5%), transient ($n=95$, 6%; 53 girls, 55.8%), and persistent ($n=31$, 1.9%; 22 girls, 71%). The group without DEB was called non-DEB ($n= 1,196$, 75.6%, 497 girls, 41.6%). All subgroups are shown in Figure 2.

The cumulative frequency analysis (from baseline to the 6-year follow-up) indicated that approximately 24.5% of the participants experienced DEB.

Disordered eating behaviors and psychopathology diagnosis

The frequencies of ED, generalized anxiety disorder, major depressive disorder, and ADHD were investigated. Supplementary Table S2 presents an overview of the frequency of these disorders in relation to sociodemographic information at baseline and the 3-year and 6-year follow-up assessments. SES is reported for w0, since these data were used in the regression analysis. At baseline, according to the Brazilian Economic Classification Criteria proposed by the Brazilian Association of Research Companies in 2010 (2010), 11.8% of participants were categorized as low income, 71.2% as low middle income, and 17% as middle and high income.

Table 1 Demographics of individuals with disordered eating behaviors in the sample

	Participants n (%)	Age M (SD; range)	Female sex n (%)	SES M (SD; range)
Baseline	191 (12.1)	10.7 (1.9; 6.0-13.9)	115 (60.2)	18.3 (4.4; 6.0-33.0)
3 year follow-up	155 (9.8)	13.5 (1.7; 10.2-17.5)	95 (61.3)	18.7 (4.6; 7.0-34.0)
6 year follow-up	190 (12.0)	18.3 (2.0; 13.8-22.9)	127 (66.8)	22.6 (6.2; 10.0-44.0)

Brazilian Economic Classification Criteria proposed by the Brazilian Association of Research Companies in 2010. Scores of 0-13 correspond to classes D and E (low income), 14-22 to class C (low middle income), and 23-46 to classes B and A (upper middle and high income). M = mean; SES = socioeconomic status.

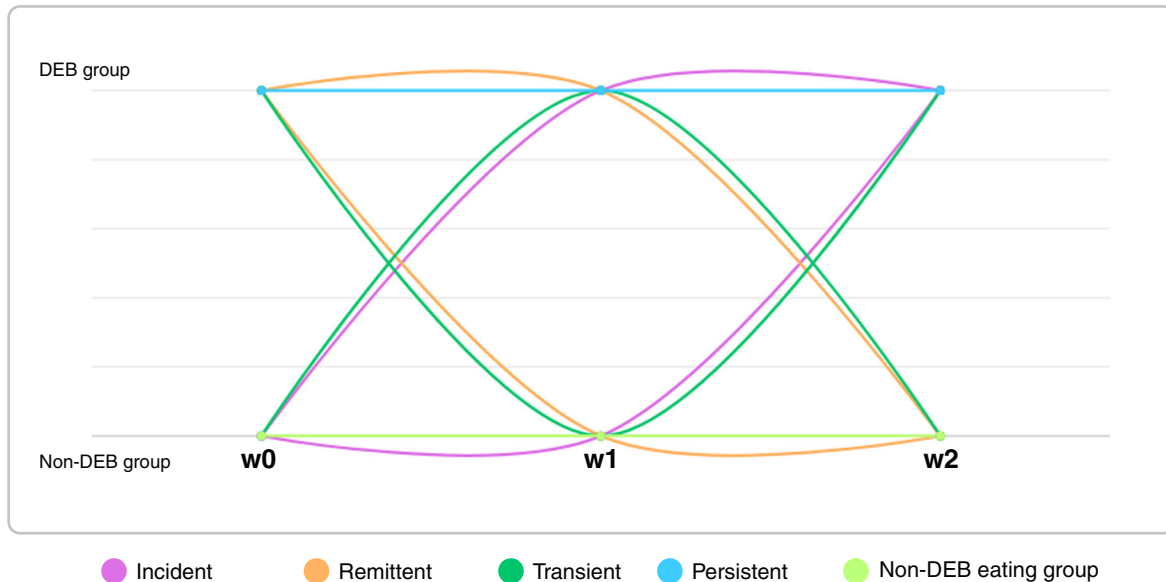


Figure 2 Disordered eating subgroups based on developmental trajectory over time. Incident = individuals who developed disordered eating behaviors (DEB) later (at w1 [3-year follow-up] and/or w2 [6-year follow-up]); persistent = individuals with DEB in all waves (w0 [baseline], w1, and w2); non-DEB group = individuals without DEB in any wave; remittent = individuals who initially (at w0 and/or w1) but not subsequently (at w1 and/or w2) had DEB; transient = individuals with intermittent DEB.

Logistic regression analysis revealed that DEB was significantly associated with an increased likelihood of psychopathology development, showing a 2.10-fold higher risk in the DEB group (adjusted OR 2.10, 95%CI 1.64-2.70, $p < 0.001$). DEB were also significantly associated with emotional disorders (adjusted OR 2.11, 95%CI 1.62-2.73, $p < 0.001$), ED (adjusted OR 5.18, 95%CI 1.94-13.83, $p = 0.001$), and major depressive disorder (adjusted OR 2.06, 95%CI 1.53-2.79, $p < 0.001$), but not generalized anxiety disorder (adjusted OR 1.38, 95%CI 0.84-2.26, $p = 0.203$) or ADHD (adjusted OR 1.39, 95%CI 0.72-2.73, $p = 0.326$). The results for all covariates are shown in Supplementary Table S3.

Disordered eating behaviors and psychopathology symptoms

The effects of DEB and time on CBCL subscale scores (internalizing, externalizing, attention, and total problems) were assessed through mixed-design analysis of variance. The DEB group had higher total problem scores ($F = 54.191$, $p < 0.001$) that were not significantly affected by time ($F = 2.343$, $p = 0.096$) or DEB-time interaction ($F = 1.446$, $p = 0.236$). The DEB group had higher scores for internalizing problems ($F = 94.786$, $p < 0.001$), which were significantly affected by time ($F = 21.417$, $p < 0.001$) but not DEB-time interaction ($F = 2.705$, $p = 0.067$). DEB was also associated with higher externalizing scores ($F = 18.565$, $p < 0.001$), which were not affected by time ($F = 0.289$, $p = 0.749$) or interaction ($F = 0.969$, $p = 0.380$). DEB affected the attention problems dimension ($F = 17.337$, $p < 0.001$), including significant effects of time ($F = 9.414$, $p < 0.001$) and interaction ($F = 3.561$, $p = 0.029$). An exploratory linear regression analysis of other CBCL dimensions

found that DEB were significantly associated with all subscales except rule-breaking problems (Supplementary Table S4).

The multiple linear regression results regarding the effects of DEB and covariates on psychopathology symptoms are detailed in Table 2. Significant associations were found for the total problems dimension (F-statistic = 10.73, $p < 0.001$, adjusted $R^2 = 0.048$), the internalizing problems dimension (F-statistic = 19.25, $p < 0.001$, adjusted $R^2 = 0.087$), the externalizing problems dimension (F-statistic = 5.25, $p < 0.001$, adjusted $R^2 = 0.022$), and the attentional problems dimension (F-statistic = 7.04, $p < 0.001$, adjusted $R^2 = 0.031$).

The trajectory of disordered eating behaviors and psychopathology symptoms

The results of linear regression analysis regarding the effect of different DEB subgroups and covariates on psychopathology symptoms are detailed in Table 3. Significant results were found for the total problems dimension (F-statistic = 7.97, $p < 0.001$, adjusted $R^2 = 0.060$), which was associated with the incident, persistent, and transient groups but not the remittent group. Significant results were found for the internalizing problems dimension (F-statistic = 13.91, $p < 0.001$, adjusted $R^2 = 0.106$), which was associated with the incident, persistent, and transient groups, but not the remittent group. Significant results were also found for the externalizing problems dimension (F-statistic = 3.44, $p = 0.001$, adjusted $R^2 = 0.022$), which was associated with the incident and transient groups but not the persistent and remittent groups. Finally, significant results were found for the attention problems dimension (F-statistic = 4.94, $p < 0.001$, adjusted $R^2 = 0.035$), which

Table 2 Linear regression analysis with disordered eating behaviors as a predictor of psychopathology symptoms

Psychopathology symptoms (CBCL)	β	SE	t value	p-value
Total problems				
DEB	10.923	2.021	5.405	< 0.001
Age	-0.948	0.759	-1.247	0.213
Sex	1.938	1.658	1.169	0.243
Socioeconomic score	-0.393	0.185	-2.122	0.034
Internalizing problems				
DEB	5.569	0.761	7.315	< 0.001
Age	0.021	0.286	0.072	0.943
Sex	1.999	0.625	3.202	0.001
Socioeconomic score	-0.061	0.070	-0.873	0.383
Externalizing problems				
DEB	1.924	0.741	2.597	0.010
Age	-0.454	0.278	-1.629	0.104
Sex	0.317	0.608	0.522	0.602
Socioeconomic score	-0.195	0.068	-2.874	0.004
Attention problems				
DEB	1.449	0.374	3.869	< 0.001
Age	-0.261	0.141	-1.854	0.064
Sex	-0.743	0.307	-2.420	0.016
Socioeconomic score	-0.082	0.034	-2.379	0.018

CBCL = Child Behavior Checklist; DEB = disordered eating behaviors.

Table 3 Linear regression analysis with disordered eating behavior trajectory groups as a predictor of psychopathology symptoms

Psychopathology symptoms (CBCL)	β	SE	t value	p-value
Total Problems				
Incident group	14.416	3.111	4.634	< 0.001
Persistent group	23.950	6.045	3.962	< 0.001
Remittent group	3.129	3.283	0.953	0.341
Transient group	11.270	3.697	3.048	0.002
Age	-0.699	0.760	-0.921	0.357
Sex	1.832	1.650	1.110	0.267
Socioeconomic score	-0.407	0.185	-2.206	0.028
Internalizing problems				
Incident group	7.188	1.167	6.160	< 0.001
Persistent group	11.912	2.268	5.253	< 0.001
Remittent group	2.126	1.232	1.726	0.085
Transient group	5.397	1.387	3.892	< 0.001
Age	0.130	0.285	0.457	0.648
Sex	1.943	0.619	3.139	0.002
Socioeconomic score	-0.069	0.069	-0.994	0.320
Externalizing problems				
Incident group	2.341	1.147	2.040	0.042
Persistent group	3.226	2.230	1.447	0.148
Remittent group	0.297	1.211	0.246	0.806
Transient group	2.959	1.364	2.170	0.030
Age	-0.403	0.280	-1.438	0.151
Sex	0.323	0.609	0.531	0.596
Socioeconomic score	-0.194	0.068	-2.853	0.004
Attention problems				
Incident group	2.279	0.579	3.938	< 0.001
Persistent group	2.402	1.124	2.136	0.033
Remittent group	0.408	0.611	0.668	0.504
Transient group	1.253	0.688	1.822	0.069
Age	-0.226	0.141	-1.598	0.110
Sex	-0.767	0.307	-2.498	0.013
Socioeconomic score	-0.081	0.034	-2.369	0.018

CBCL = Child Behavior Checklist.

was associated with the incident and persistent groups but not with the transient or remittent groups.

Disordered eating behaviors and body mass index

Linear regression analysis was used to investigate the association between DEB and BMI, including all covariates (age, sex, and SES). The model's results were significant for the general DEB category (DEB vs. non-DEB) (F-statistic = 30.49, $p < 0.001$, adjusted $R^2 = 0.08$). There was a positive association between DEB ($\beta = 3.245$, $p < 0.001$) and age ($\beta = 0.435$, $p < 0.001$) and BMI, but there were no significant effects for sex ($\beta = 0.235$, $p = 0.451$) or SES ($\beta = 0.041$, $p = 0.227$).

The results were also significant for the DEB subgroups (F-statistic = 26.01, $p < 0.01$, adjusted $R^2 = 0.07$), including a positive association between all DEB subgroups and BMI (incident $\beta = 2.077$, $p < 0.001$; transient, $\beta = 3.900$, $p < 0.001$; remittent $\beta = 3.121$, $p < 0.001$; and persistent $\beta = 6.692$, $p < 0.001$). Age was positively associated with BMI ($\beta = 0.437$, $p < 0.001$), but sex ($\beta = 0.248$, $p = 0.423$) and SES ($\beta = 0.034$, $p = 0.311$) did not influence the outcome.

Discussion

Our study investigated the trajectory of DEB and its associations with psychopathology in a cohort of children and adolescents. DEB varied significantly over time, with only a small proportion of individuals displaying a persistent pattern. DEB were strongly associated with higher rates of internalizing symptoms, particularly among girls, while the association with externalizing behaviors was weaker. DEB also increased the likelihood of developing ED and major depressive disorder. We also found a positive association between DEB and BMI when comparing the DEB group and subgroups (incident, remittent, transient, and persistent).

Disordered eating behaviors: frequency, trajectory, and risk factors

The frequency of DEB in our cohort was 12.1% at baseline, 9.8% at the 3-year follow-up assessment, and 12% at the 6-year follow-up assessment. These rates are slightly lower than previous reports, which might be attributable to the fact that our sample was from a low-/middle-income country, in contrast to studies conducted in high-income countries³³ or among specific demographic groups,^{8,11,13} whose characteristics could differ from the general population. Most Brazilian studies⁸⁻¹² on DEB have focused on adolescents and young adults, finding prevalence rates around 20%. In contrast, our data are from individuals in early childhood, which may explain the lower frequency of DEB, given that the onset of eating problems is more common during adolescence.³⁹ Additionally, the lack of standardized instruments for measuring DEB could also influence the variability of results across studies.

We also examined the developmental trajectory of DEB over time. Our findings suggest that DEB are variable,

with only a small percentage of participants showing a persistent pattern (1.95%) throughout development. In the majority of individuals, DEB fluctuated over time, with 8.21% experiencing incident DEB, 8.27% experiencing remission, and 6% experiencing transient episodes. These findings are consistent with a previous longitudinal study¹⁷ on DEB trajectories in girls, which identified distinct DEB patterns over time.

Contrary to these findings, a 10-year longitudinal study¹⁸ reported that DEB consistently worsened or remained stable over time. Nunes et al.⁴⁰ also found similar results on the presence of DEB at the initial evaluation and its persistence 4 years later. It is important to note that their study primarily focused on adolescents and young adults, whereas our sample mainly consisted of children and adolescents. It is important to consider that different developmental stages could influence DEB variability. We found an increased risk of DEB with advancing age, as noted in a previous study,⁴¹ and DEB has also been associated with the onset of puberty.^{26,39,42,43}

Our findings also show that girls are more prone to DEB, which is consistent with previous research.^{23,44,45} Santana et al.²³ found that girls were more likely to experience DEB, especially strict dieting or fasting, and that this likelihood significantly increased over a 5-year period. Lower SES was also associated with a higher prevalence of DEB, which was consistent with previous research.⁴⁶ Several studies have pointed out that an altered relationship with the body is a key risk factor in worsening DEB, including internalization of the thin ideal,⁴⁷ concerns about weight gain,⁴⁸ and body dissatisfaction.^{26,41,46,49}

Despite its subclinical nature, DEB can lead to significant physical¹⁸ and psychological distress.^{26,30} Our longitudinal data reveal that nearly a quarter of individuals experience DEB at some point in their lives, which highlights the need for early detection and intervention. Further longitudinal research is needed to clarify how DEB evolve over time across different life stages, enhancing our understanding of its trajectory.

Disordered eating behaviors and psychopathology

Given the longitudinal nature of our study, we examined the effects of DEB, time, and their interaction on psychopathology. DEB significantly impacted all analyzed dimensions, influencing the total problems, internalizing problems, externalizing problems, and attention problems domains. Time only affected internalizing problems and attention problems, suggesting these dimensions are time-sensitive. The interaction between DEB and time was significant only for the attention problems dimension, suggesting that the effects of DEB on attention difficulties may evolve over time.

Our results indicate that DEB are both an indicator and a risk factor for mental health issues, with DEB subgroups (except the remittent group) significantly affecting the total problems dimension. It is reasonable to expect that the remittent group, who ceased to experience DEB, would not be associated with high symptom levels. A previous study⁴⁰ with adolescents and young women found that

DEB were associated with a higher chance of developing a psychiatric diagnosis. Additionally, COVID-19 pandemic research has shown an association between DEB and negative mood changes in young women.¹⁸

In our sample, DEB were significantly associated with internalizing problems, which is consistent with previous studies linking eating issues to emotional issues.^{4,19} Girls were more likely to experience both DEB and internalizing problems, which aligns with other findings that girls have a higher DEB prevalence and likelihood of emotional issues, especially during adolescence.^{45,50} All of the DEB subgroups had a significant effect on internalizing symptoms except for the remittent group, which can be explained by the discontinuity of DEB over time in this subgroup and its impact on symptomatology.

We observed a significant association between DEB and ED, which aligns with current research linking these conditions with shared behaviors, such as dieting or binge eating.^{20,51} Our analysis revealed that DEB significantly influence ED, increasing their likelihood by 5.18 times. However, it remains unclear whether early life DEB are an early manifestation of ED or if the relationship is more complex. Alvarenga et al.⁵² explored DEB in individuals with ED, finding DEB specificities for each type of diagnosed ED, which could indicate that different forms of DEB may lead to varying ED outcomes. This complex relationship and its underlying mechanisms should be clarified in future research to determine whether early intervention in DEB could help prevent ED onset, particularly given the high mortality rates^{53,54} linked to these disorders.

There was a strong association between DEB and major depressive disorder, which is in line with the current literature.^{10,19,21} Puccio et al.²¹ propose that DEB and major depressive disorder may act as mutual risk factors, implying shared underlying mechanisms, which could be investigated in future studies. One study¹⁰ found that 18% of the variance in risk behaviors for ED (called DEB in our study) was explained by depressive symptoms.

DEB did not have a significant effect on generalized anxiety disorder in our study, which is in line with the results of Holm-Denoma et al.¹⁹ In contrast, other authors⁴ have discussed the high comorbidity between generalized anxiety disorder and major depressive disorder, suggesting that anxiety may attenuate the strong association between depression and DEB. Comorbidity between these diagnoses may help explain the variability in findings across studies.

The externalizing symptoms dimension does not seem strongly related to DEB, showing only a small predictive effect in our study. Among the DEB subgroups, only the incident and transient groups influenced the externalizing symptoms dimension, although with a smaller effect than the other dimensions. This is consistent with previous studies that have reported a weaker association between DEB and externalizing symptoms, given that male sex may significantly influence the occurrence of these symptoms.²⁷

ADHD has been associated with ED, mostly binge eating,⁵⁵⁻⁵⁷ but research into its relationship with DEB is scarce. In our study, overall ADHD diagnosis was not

significantly influenced by DEB. However, attentional symptoms were associated with DEB, which supports the hypothesis that the attentional aspects of ADHD are specifically linked to DEB habits.^{28,29,58} Nevertheless, it is important to explore the complexities of this relationship, particularly given the time-dependent nature of these interactions. Regarding DEB subgroups, only the incident and persistent groups significantly affected this dimension.

Disordered eating behaviors and body mass index

DEB can affect mental health and has significant implications for physical health^{18,26} and higher BMI.^{23,25,59} The adverse effects of DEB reach beyond psychological distress, which shows the importance of comprehensive approaches that address both mental and physical well-being. We found a positive association between BMI and DEB, both overall and for different DEB subgroups. This is in line with various studies that have discussed the relationship between a higher BMI and DEB,^{8,10,23,24,48} which supports the hypothesis that DEB are associated with changes in BMI over time.

Ferreira et al.¹² found that specific DEB patterns, such as binge eating and strict dieting or fasting, are more closely linked to higher BMI in adolescents, while purging behaviors tend to be associated with being underweight. This suggests that DEB are predominantly related to higher BMI, though some forms of disordered eating may influence BMI in different ways. Interestingly, the same study found no significant relationship between BMI and DEB in adults, which could indicate an age-related effect. Five years later, a follow-up to this population-based cross-sectional study,²³ using probability sampling, confirmed an even stronger association between DEB and higher BMI. These findings emphasize the relationship between DEB and weight gain and suggest that the increase in DEB prevalence could contribute to increasing rates of overweight, as we hypothesized.

The persistent DEB subgroup had the highest estimated coefficient, indicating a significant increase in BMI for these individuals. The other groups also showed significant, albeit more moderate, increases in BMI. It is important to emphasize that although the association between DEB and BMI was statistically significant, the model accounts for only a modest portion of the variation in BMI. Other factors, such as lifestyle, genetics, and environmental influences, also play a significant role in weight gain and should be explored in future studies. More research is needed to deepen our understanding of the mechanisms underlying these associations.

Summary

Defining and measuring DEB remains challenging due to their complexity and the lack of a universal definition or standardized measurement instruments,² which complicates accurate assessment and comparison across contexts and populations. DEB often go unnoticed by individuals and their caregivers, resulting in a lack of professional intervention, which exacerbates their

long-term impact on quality of life. It is also worth noting that no specific treatment protocols exist for DEB.

Our research, whose aim was to deepen understanding of DEB, particularly among children and adolescents, highlights the need for practical interventions focused on early detection and treatment. Early intervention, potentially through public policy, could significantly mitigate the long-term impacts of DEB on mental health and quality of life. Clinicians, educators, and caregivers would benefit from increased awareness and targeted training programs to identify early signs of DEB. Better understanding of DEB could facilitate the development of standardized instruments.

Future longitudinal studies should further investigate the development and trajectory of DEB and their impact on quality of life and mental health symptoms, particularly in low- and middle-income countries. Research should also prioritize the identification and development of effective interventions, especially for children and adolescents.

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Disclosure

The authors report no conflicts of interest.

Data availability statement

Anonymized data is available upon request. The Brazilian High-Risk Cohort project is available at <https://osf.io/ktz5h/>.

Author contributions

IPO: Conceptualization, Data curation, Formal analysis, Writing – original draft.

ACF: Formal analysis, Writing – original draft.

GAS: Funding acquisition, methodology, project administration, and writing – review & editing.

AG: Writing – review & editing.

PMP: Funding acquisition, Project administration, Writing – review & editing.

ECM: Funding acquisition, Project administration, and Writing – review & editing.

DCM: Conceptualization, Supervision.

PB: Conceptualization, Data curation, Formal analysis, Supervision, Writing – original draft.

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Supplementary Table S1 Distribution of responses to Disordered Eating items

Distribution of responses to Disordered Eating items						
Items	Baseline (n=2,511)		3-year follow-up (n=2,010)		6-year follow-up (n=1,787)	
	Total, n (%)	Girls, n (%) ^a	Total, n (%)	Girls, n (%) [†]	Total, n (%)	Girls, n (%) [†]
Feels fat when isn't?	514 (20.5%) [‡]	313 (60.9%)	460 (22.9%) [‡]	283 (61.5%)	381 (21.3%) [‡]	254 (66.7%)
Ashamed of eating habits?	327 (13.0%) [‡]	189 (57.8%)	286 (14.2%) [‡]	161 (56.3%)	217 (12.1%) [‡]	134 (61.7%)
Deliberate vomiting?	63 (2.5%)	32 (50.8%)	33 (1.6%) [‡]	24 (72.7%)	40 (2.2%) [‡]	31 (77.5%)
Eating concerns interfere a lot?	192 (7.6%)	99 (51.6%)	138 (6.9%)	73 (52.9%)	73 (4.1%) [‡]	47 (64.4%)
Blames self a lot for overeating?	121 (4.8%) [‡]	85 (70.2%)	125 (6.2%) [‡]	85 (68.0%)	143 (8.0%) [‡]	103 (72.0%)

†

Percentage of girls in relation to the total number of respondents.

[‡] Indicates when there is a difference between boys and girls.

Supplementary Table S2 Frequency of mental health disorders across follow-up waves

Disorder presence [†]	Participants, n (%)	Age, mean (SD; range)	Girls, n (%)	SES, mean (SD; range)
Baseline	2.511	10.2 (1.9; 5.8-14.4)	1.176(46.8%)	18.3 (4.6; 2-37)
EDs [‡]	10 (0.4%)	10.5 (2.2; 7.4-13.3)	6 (60.0%)	18.9 (3.3; 15-23)
GAD	47 (1.9%)	10.6 (1.9; 6.6-14.2)	28 (59.5%)	17.7 (5.1; 9-29)
MDD	73 (2.9%)	10.7 (1.7; 6.8-13.9)	36 (49.3%)	17.2 (4.2; 7-27)
ADHD	274 (10.9%)	10.0 (1.8; 6.7-13.9)	98 (35.8%)	17.9 (4.2; 6-31)
3 year follow-up	2.010	13.5 (1.9; 9.2-17.9)	889(44.2%)	
EDs	18 (0.9%)	13.1 (1.4; 11.4-16.7)	13 (72.2%)	
GAD	40 (2.0%)	14.2 (1.9; 9.9-17.1)	23 (57.5%)	
MDD	115 (5.7%)	13.9 (1.8; 10.2-17.7)	77 (66.9%)	
ADHD	105 (5.2%)	13.1 (1.8; 10.1-17.3)	33 (31.4%)	
6 year follow-up	1.905	18.2 (2.0; 13.5-23.1)	873(45.8%)	
EDs	18 (0.9%)	18.4 (2.3; 14.5-21.8)	9 (50.0%)	
GAD	102 (5.3%)	18.8 (1.9; 14.6-21.9)	64 (62.7%)	
MDD	281 (14.7%)	18.4 (2.0; 14.6-11.9)	182 (74.7%)	
ADHD	52 (2.7%)	18.1 (2.0; 14.3-21.8)	15 (28.8%)	

ADHD = attention-deficit/hyperactivity disorder; ED = eating disorder; GAD = generalized anxiety disorder; MDD = major depression disorder; SES = socioeconomic score.

[†] Children meeting the Development and Well-Being Assessment diagnostic criteria; includes other disorders – not mutually exclusive.

[‡] EDs, including anorexia nervosa, bulimia nervosa, binge eating disorder, and eating disorder – not otherwise specified.

Supplementary Table S3 Regression analysis with predictors of diagnosis

DAWBA diagnoses	β	SE	T-value	P-value
Emotional disorders [†]				
DEB	0.748	0.133	5.636	<0.001
Age	0.035	0.032	1.087	0.277
Sex	0.764	0.126	6.083	<0.001
SES	0.006	0.014	0.473	0.636
EDs [‡]				
DEB	1.645	0.501	3.282	0.001
Age	0.004	0.125	0.033	0.973
Sex	-0.201	0.487	-0.413	0.679
SES	-0.001	0.054	-0.026	0.979
GAD				
DEB	0.320	0.252	1.270	0.204
Age	0.154	0.061	2.528	0.011
Sex	0.770	0.248	3.110	0.002
SES	0.375	0.025	1.510	0.131
MDD				
DEB	0.727	0.152	4.774	<0.001
Age	0.057	0.037	1.510	0.131
Sex	0.734	0.150	4.899	<0.001
SES	0.003	0.016	0.197	0.844
ADHD				
DEB	0.335	0.341	0.982	0.326
Age	-0.004	0.079	-0.050	0.960
Sex	-0.681	0.325	-2.095	0.036
SES	-0.023	0.034	-0.669	0.503

ADHD = attention-deficit/hyperactivity disorder; DAWBA = Development and Well-Being Assessment; DEB = Disordered Eating Behaviors; GAD = generalized anxiety disorder; MDD = major depression disorder; SES = socioeconomic score.

[†] Emotional disorders refers to anxiety, depression, and related affective disorders.

[‡] EDs, including anorexia nervosa, bulimia nervosa, binge eating disorder, and eating disorder – not otherwise specified.

Supplementary Table S4 Regression analysis with predictors for CBCL subscales

CBCL	β	SE	T-value	P-value
Anxious/depressed problems				
DEB	2.383	0.357	6.675	<0.001***
Age	-0.147	0.135	-1.092	0.275
Sex	1.196	0.293	4.090	<0.001***
SES	-0.027	0.332	-0.822	0.411
Withdrawal problems				
DEB	1.300	0.280	4.641	<0.001***
Age	159	0.105	1.510	0.131
Sex	-137	0.229	-0.597	0.550
SES	-52	0.026	-2.041	0.042*
Somatic complaint problems				
DEB	1.963	0.273	7.190	<0.001***
Age	0.047	0.103	0.455	0.649
Sex	0.957	0.224	4.280	<0.001***
SES	0.018	0.025	0.722	0.471
Social problems				
DEB	0.938	0.243	3.861	<0.001***
Age	-0.166	0.091	-1.826	0.068
Sex	0.426	0.199	2.146	0.032*
SES	-0.040	0.022	-1.820	0.069
Thought problems				
DEB	1.032	0.238	4.339	<0.001***
Age	-0.093	0.090	-1.040	0.299
Sex	-0.052	0.195	-0.265	0.791
SES	-0.015	0.022	-0.682	0.495
Rule breaking problems				
DEB	0.449	0.279	1.607	0.108
Age	-0.006	0.105	-0.056	0.955
Sex	-0.421	0.229	-1.836	0.067
SES	-0.077	0.026	-3.023	0.003**
Aggressive behavior				
DEB	1.491	0.512	2.914	0.004**
Age	-0.450	0.192	-2.338	0.002*
Sex	0.706	0.420	1.682	0.093
SES	-0.112	0.047	-2.380	0.018*

CBCL = Child Behavior Checklist; DEB = Disordered Eating Behaviors; SES = socioeconomic score.

2.2 ARTICLE 2

Oliveira, I. P. de., Salum, G. A., Mograbi, D. C., & Bado, P. P. (ano). Insight in Brazilian children and adolescents with mental health conditions.

Insight in Brazilian children and adolescents with mental health conditions

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Abstract

Objective: Insight is a key concept in psychiatry, referring to an individual's awareness of their clinical condition. It includes recognizing the disorder, understanding symptoms, and acknowledging the need for treatment. Impaired insight is linked to poor treatment adherence and prognosis, while preserved insight improves outcomes. However, higher insight levels may increase psychological distress. Research on insight in children and adolescents remains limited, particularly in low- and middle-income countries. This study explores insight in a population-based sample of Brazilian children and adolescents. **Methods:** The sample included participants from the Brazilian High-Risk Cohort for Mental Conditions, including the first wave (n= 179) in 2013 (ages 9–18) and the second wave (n= 189) in 2013 (ages 12–21). Individuals' awareness of their mental health condition was assessed using the Applause Questionnaire. Psychopathology diagnoses and symptoms were evaluated through the Development and Well-Being Assessment and the Child Behavior Checklist. **Results:** The majority of children and adolescents presented a preserved insight at wave one (81.6%) and two (69.3%), but individuals with multiple diagnoses at the second wave were more frequently in the impaired insight group. Age and stress also influenced insight levels. Across all investigated diagnoses—Anxiety Disorders, Attention-Deficit/Hyperactivity Disorder, Mood Disorders, Oppositional and Conduct Disorders, Obsessive-Compulsive Disorder, and Post-Traumatic Stress Disorder— there was no difference between preserved and impaired insight group. This pattern was also observed for both internalizing and externalizing symptoms. **Conclusions:** Insight is an important factor in mental health, presenting a paradox where greater awareness can enhance treatment adherence but also heighten psychological distress. Further research is needed to better understand this relationship and identify strategies to balance these effects and improve clinical outcomes and explore diagnoses more closely associated with impaired insight that were not included in our sample.

Key-words: Impaired Insight; Mental health; Psychopathology; Children; Adolescents.

Introduction

Insight can be defined as the awareness of having a clinical condition (Lewis, 1934), with the term loss of insight being often employed in relation to psychiatric disorders (Mograbi & Morris, 2018). It encompasses several dimensions, including recognition of the disorder itself, an understanding of its symptoms and social impact, and acknowledgment of the need for treatment (Cooke et al., 2010; Marková & Berrios, 1992; Parellada et al., 2009). Although the theme has been widely explored, conclusive information on the nature and role of insight in people with different disorders, as well as its relationship with disease and non-disease factors, remains limited (Marková & Berrios, 2011). Loss of insight may be linked to a variety of factors, with explanations for the phenomenon including neurocognitive (Hornberger et al., 2014), psychological (Lysaker et al., 2003) and social approaches (Macgregor et al., 2015; Pruß et al., 2012).

In psychiatry, the link between impaired insight and psychopathology has primarily been explored in the context of psychotic disorders (Konstantakopoulos, 2019; Lysaker et al., 2018; Mutsatsa et al., 2006), with research on non-psychotic disorders still being comparatively limited. Some studies investigated insight in mood disorders (Camelo et al., 2019; Lee et al., 2010; Silva et al., 2015), eating disorders (Konstantakopoulos et al., 2011), obsessive-compulsive disorder (OCD, De Avila et al., 2019; Guillén-Font et al., 2021) and anxiety disorders (Halaj et al., 2024). Nevertheless, the literature is scarcer for other conditions, such as Attention-Deficit/Hyperactivity Disorder (ADHD), Oppositional and Conduct Disorders and Post-Traumatic Stress Disorder (PTSD).

Additionally, there is a gap in understanding the development of insight during childhood and adolescence, with a limited number of studies exploring this (Adelman & Lebowitz, 2012; Nissen & Parner, 2018; Parellada et al., 2009). Mental health disorders in children and adolescents are both highly prevalent and often undertreated (Guthold et al., 2023; Kessler et al., 2005; Radez et al., 2021), making the understanding of insight in this age group crucial for identifying early intervention strategies that promote mental health awareness and improve long-term treatment outcomes. Research has shown that poorer insight is linked to a negative attitude towards treatment and medication adherence (Lincoln et al., 2016; Misdrahi et al., 2016), greater symptom severity and impaired social functioning (Lysaker et al., 2018). Conversely, greater insight is also linked to impairments such as psychological distress, and higher levels of depression and suicidality (García-Mieres et al., 2020; Lysaker et al., 2018), which has been described as the “insight paradox”.

Moreover, most research on insight has been conducted in clinical settings, focusing on patients who have already sought help and are likely to have some degree of illness awareness. These studies may overlook how insight manifests in the broader population, including individuals who experience psychological difficulties but do not have formal diagnosis or treatment. For some conditions, limited awareness of symptoms has been shown to be more prevalent in community-based studies (e.g. dementia; Mograbi et al., 2012, 2015). Therefore, it is important to investigate this within non-clinical settings, especially in the case of children and adolescents, who may be facing emotional challenges without fully understanding or recognizing them.

Furthermore, research on insight has been conducted mostly in high-income countries, where usually there are well-developed mental health systems and greater access to diagnostic and treatment services. In contrast, in contexts with limited resources and restricted access to care (Fatori et al., 2019), mental health stigma (Kalisova et al., 2018) and other factors that affect the perception of mental health may significantly influence the development and recognition of insight. Investigating how insight manifests in these diverse contexts is essential for adapting healthcare models and interventions to local realities, reducing barriers to mental health care.

In this context, this study aims to investigate insight within a population-based sample of children and adolescents from the Brazilian High-Risk Cohort for Mental Disorders (BHRC, Salum et al., 2015). This research aims to enhance the limited body of knowledge on insight during early developmental stages and within population-based samples, providing new data into associated factors and its manifestation across different diagnoses.

Methods

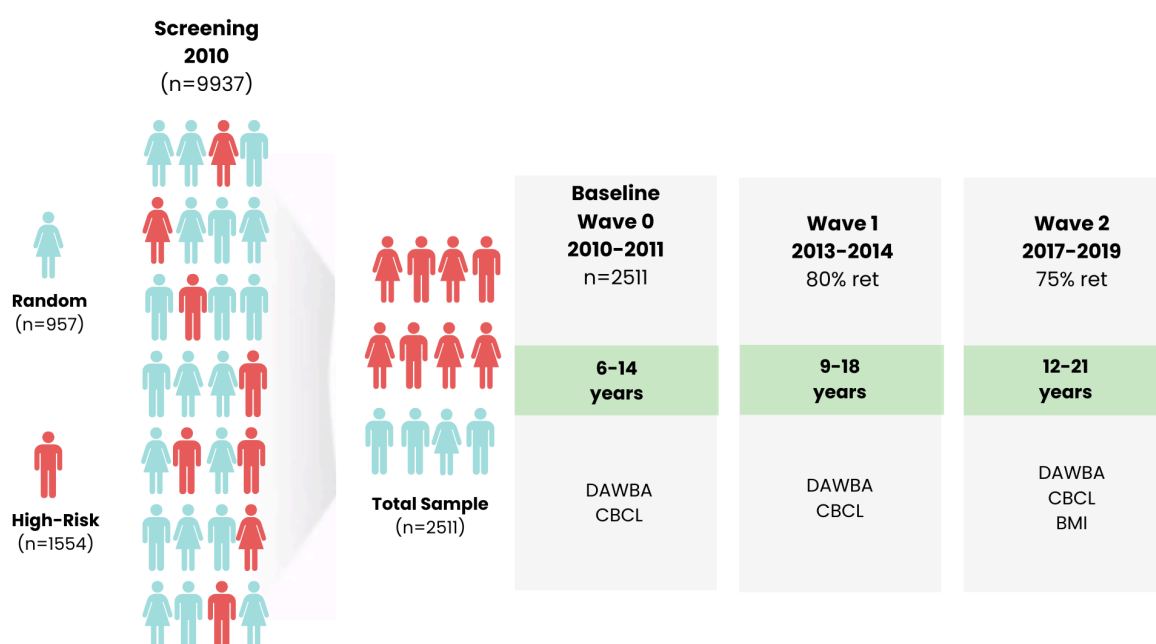
Sample characteristics

This study utilizes data from the Brazilian High-Risk Cohort Study for Childhood Psychiatric Disorders (BHRC, Salum et al., 2015), conducted by the National Institute of Developmental Psychiatry (INPD). The BHRC investigates typical and atypical trajectories of psychopathology and cognition (<https://inpd.org.br/pesquisa-conexao/>). Clinical and behavioral assessment questionnaires were employed to examine mental health data, complemented by additional instruments for neuroimaging and genetic investigations.

Detailed protocols and further information about the study are available on the Open Science Framework (<https://osf.io/ktz5h>).

In the BHRC, children and adolescents from 57 schools in Porto Alegre and São Paulo were selected in two subsamples: a high-risk group (N=1,553) comprising individuals with a family history of mental health issues, and a random group (N=958) consisting of individuals without such family history. This is a longitudinal study, with three assessment stages completed to date, as shown in Figure 1. A more detailed description of the study sample can be found in Salum and collaborators (2015). In our study, the initial sample included individuals with valid Applause Questionnaire data at wave one (W1, n=483) and wave two (W2, n=1,618) and who had been diagnosed with a mental health disorder, resulting in a final sample of 179 individuals at W1 and 189 at W2.

Figure 1 - Sample characteristics and collected instruments in the Brazilian High Risk Cohort Study for Mental Conditions.



Legend: BMI = body mass index; CBCL = Child Behavior Checklist; DAWBA = Development and Well-Being Assessment; ret = retention.

Measurements

Insight

The measurement of insight was derived from the Applause questionnaire. This tool is used to assess how people access healthcare services in England and was adapted to Brazil. It

gathers personal experiences of both positive and negative interactions with healthcare providers, as well as the cultural and social factors that affect access to these services. In this study, we used the subscale for self-identification as having mental illness (Selfie - SE Section) to measure insight compared to diagnostic data. The SE section is a Likert scale (ranging from 0 - Strongly Disagree to 5 - Strongly Agree) consisting of five items: SE1 - Current issues I am facing could be the first signs of a mental illness; SE2 - The thought of myself having a mental illness seems doubtful to me; SE3 - I could be the type of person that is likely to have a mental illness; SE4 - I see myself as a person that is mentally healthy and emotionally stable; SE5 - I am mentally stable, I do not have a mental health problem. We evaluated the internal consistency of the SE section of the Applause questionnaire using correlation analysis (Table S1). Based on this analysis, which indicated a weaker correlation for certain items, we decided to retain only items 4 and 5, as they demonstrated stronger statistical relevance to the construct of self-identification as having a mental illness.

To assess insight, we compared individuals' self-identification as having a mental illness with their actual diagnoses of mental health disorders. Diagnoses were evaluated using the Development and Well-Being Assessment (DAWBA, Goodman et al., 2000), which was administered by trained and experienced interviewers. These interviewers followed established procedures and protocols as outlined in the administration manual. To define the insight variable, we adopted a conservative approach, classifying individuals with a mean score greater than 3 across items 4 and 5, as not perceiving themselves as having mental health issues. Subsequently, we created a binary insight variable: “preserved insight”, for individuals who have a diagnosis and acknowledge their mental health issues, and “impaired insight”, for individuals who have a diagnosis but perceive themselves as mentally and emotionally stable.

Psychopathology

As mentioned earlier, diagnoses were assessed using DAWBA. Additionally, we utilized the Child Behavior Checklist (CBCL, Bordin, 1995) to gain a broader understanding of mental health concerns and their relationship with insight groups, extending beyond a purely diagnostic approach. The CBCL evaluates the behavioral and emotional functioning of children and adolescents through 113 items. It provides an overall measure of total problems and two primary subcategories: internalizing problems, which encompass emotional difficulties, and externalizing problems, which involve outwardly expressed behavioral issues.

The CBCL also includes more specific subscales that were not utilized in this study but can be consulted in Bordin (1995) for a more detailed understanding. In this study, we examined the influence of internalizing and externalizing problems on insight group classification.

Stress

The stress variable was developed in a previous study using data from the BHRC (Schäfer et al., unpublished). It focuses on stressful life events reported by the parents of children, occurring in the three years prior to each assessment at W1 and W2. To calculate this variable, the authors conducted an exploratory factor analysis (EFA) using a one-factor model, which included nine key indicators: parental unemployment, parental divorce, family financial problems, witnessing family fights, family or friend health problem, fire or flood, death of a caregiver, family or friend death, and loss of a pet. This model was subsequently validated through confirmatory factor analyses (CFA) across various subsamples of the BHRC.

Statistical analysis

The statistical analyses were conducted in R using RStudio (version 4.3.2). A cross-sectional analysis was conducted for the first wave (W1) and the second wave (W2). For each wave, prevalence was described, and factors associated with insight were explored using logistic regression. The regression analysis included the following variables: age, sex, Socioeconomic Score (SES)¹, maternal education, stress and IQ (measured only at baseline).

We also conducted a chi-square test to examine whether the likelihood of belonging to a specific insight group varied across diagnostic categories and dimensional classifications (internalizing and externalizing symptoms). To strengthen the robustness of the analysis, certain diagnoses were grouped into broader categories based on the DSM-5 classification (American Psychiatric Association, 2013). For instance, Anxiety Disorders included Agoraphobia, Generalized Anxiety Disorder, Panic Disorder, Separation Anxiety, Social Phobia, and Specific Phobia, while Mood Disorders encompassed Depressive Disorders, Disruptive Mood Dysregulation Disorder, and Mania/Bipolar Disorder. Although psychotic

¹ The Socioeconomic Score is derived from the Brazilian Association of Research Companies (ABEP index, 2010). Scores of 0 - 13 correspond to classes D and E (low income), 14 - 22 to class C (low middle income), and 23 - 46 to classes B and A (upper middle and high income) in Brazil.

disorders are widely studied in this field, we excluded this category due to the very limited sample size ($n=1$). Additionally, participants were categorized into two groups: single diagnosis and multiple diagnoses (ranging from two to four diagnoses)

Results

Insight Groups and Associated Life Factors

Insight was classified into two categories: preserved and impaired. Table 1 presents the distribution of individuals across the insight groups.

Table 1 - Distribution of Individuals by Insight Group within the Sample

Insight Groups Among Individuals within the Sample		
	Preserved Insight	Impaired Insight
W1 n (%)	146 (81.6%)	33(18.4%)
Female sex (n, %)	63(43.2%)	17(52.5%)
Age (mean, SD)	12.9 (1.9; 9 – 17)	12.5 (1.8; 9 – 16)
Socioeconomic Score ^a (mean, SD)	17.9 (4.0; 9 – 34)	18 (4.0; 11 – 27)
W2 n(%)	131(69.3%)	58 (30.7%)
Female sex n (%)	70 (53.4%)	40 (69 %)
Age M (SD, range)	16 (1; 14 – 17)	15.9 (0.9; 14 – 17)
Socioeconomic Score ^a (mean, SD)	23.8 (7; 10 – 47)	25.3 (9; 10 – 46)

^a Socioeconomic Score is derived from ABEP index (2010).

Table 2 shows insight groups at W1 and W2 for individuals with a single diagnosis and those with multiple diagnoses (ranging from 2 to 4). No differences were found in age, sex, or SES at either time point. While insight groups did not differ significantly at W1, a significant difference emerged at W2 for individuals with multiple diagnoses ($\chi^2 = 8.28$, $df = 1$, $p = .004$).

Table 2 - Distribution of Insight Groups Among Individuals with a Single Diagnosis

Insight Groups Among Individuals according to Diagnoses		
W1	Single Diagnosis	Multiple Diagnoses
Preserved Insight n (%)	95 (85.6%)	49 (75.4%)
Female sex (n, %)	45 (47.4%)	17(34.7%)
Age (mean, SD)	13.1 (2; 9 – 17)	12.7 (1.8; 10 – 17)
Socioeconomic Score ^a (mean, SD)	18 (4.3; 9 – 34)	17.7 (3.6; 9 – 26)
Impaired Insight n (%)	16(14.4%)	16 (24.6%)
Female sex (n, %)	5 (31.2%)	11 (68.8%)
Age (mean, SD)	11.8 (1.4; 9 – 14)	12.9 (1.9; 10 – 16)
Socioeconomic Score ^a (mean, SD)	17.6 (3.6; 11 – 22)	17.9 (3.9; 12 – 26)
W2		
Preserved Insight n (%)	90(76.3%)	36 (54.5%)
Female sex (n, %)	52 (57.8%)	16 (44.4%)
Age (mean, SD)	16.1 (0.9; 14 – 17)	15.8(1; 14 – 17)
Socioeconomic Score ^a (mean, SD)	24.1 (6.8; 11 – 47)	23.1 (6.9; 10 – 35)
Impaired Insight n (%)	28(23.7%)	30 (45.5%)
Female sex (n, %)	15 (53.6%)	25 (83.3%)
Age (mean, SD)	15.8 (0.9; 14 – 17)	16 (0.9; 14 – 17)
Socioeconomic Score ^a (mean, SD)	26.4 (9.4; 10 – 46)	24.4 (8.6; 12 – 45)

^a Socioeconomic Score is derived from ABEP index (2010).

The results of the logistic regression examining life factors associated with the insight group are summarized in Table 3. In the unadjusted model, female sex was positively associated with impaired insight at W2, relationship was no longer significant after adjusting for other variables. In the adjusted model, both age and stress at W1 were significantly positively associated with preserved insight. At W2, stress remained a significant predictor, but in the opposite direction, showing a significant positive correlation with impaired insight.

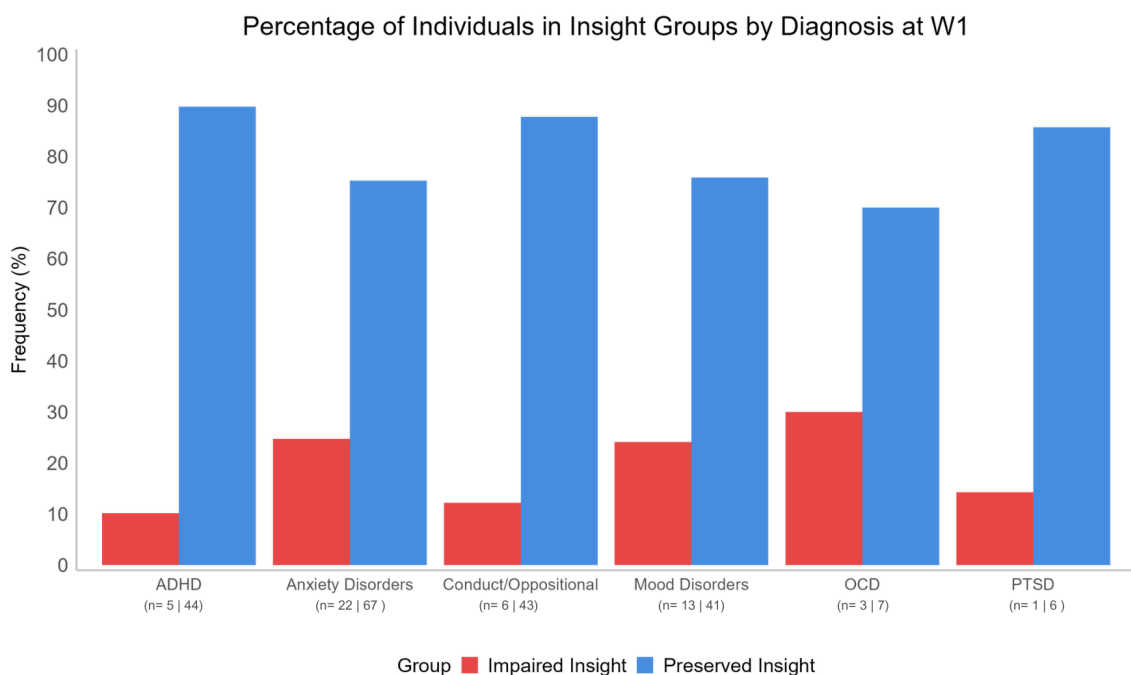
Table 3 - Risk Factors Associated with Impaired Insight in the Sample at W1 and W2.

Risk Factors Associated with Impaired Insight				
	W1		W2	
Variable	Unadjusted OR (CIs)	Adjusted OR (CIs)	Unadjusted OR (CIs)	Adjusted OR (CIs)
Age	0.87 (0.71 – 1.07)	0.76 (0.60 – 0.97)	0.92 (0.66 – 1.28)	0.92 (0.62 – 1.36)
Sex	1.40 (0.66 – 2.98)	0.93 (0.38 – 2.27)	1.94 (1.01 – 3.72)	2.12 (0.96 – 4.71)
Socioeconomic score ^a	1.01 (0.92 – 1.11)	0.99 (0.87 – 1.11)	1.03 (0.99 – 1.07)	1.04 (0.98 – 1.10)
Mother instruction	0.80 (0.61 – 1.05)	0.82 (0.60 – 1.11)	1.17 (0.95 – 1.45)	1.13 (0.86 – 1.49)
Stress	0.47 (0.25 – 0.89)	0.46 (0.23 – 0.91)	1.54 (0.91 – 2.60)	1.99 (1.09 – 3.63)
IQ	1.00 (0.97 – 1.03)	1.01 (0.98 – 1.04)	1.01 (0.99 – 1.03)	1.01 (0.98 – 1.03)

^a Socioeconomic Score is derived from ABEP index (2010).

Insight and psychopathology

Several diagnoses were identified within our subsample of insight groups, including Anxiety Disorders, ADHD, Mood Disorders, Oppositional and Conduct Disorders, OCD, and PTSD. Figure 2 presents the diagnostic distribution at W1, illustrating the percentage of individuals in each insight group. No significant association was found between different diagnoses and insight ($\chi^2 = 7.46$, $df = 5$, $p = .189$) at W1.

Figure 2 - Percentage of Individuals in Insight Groups by Diagnosis at W1.

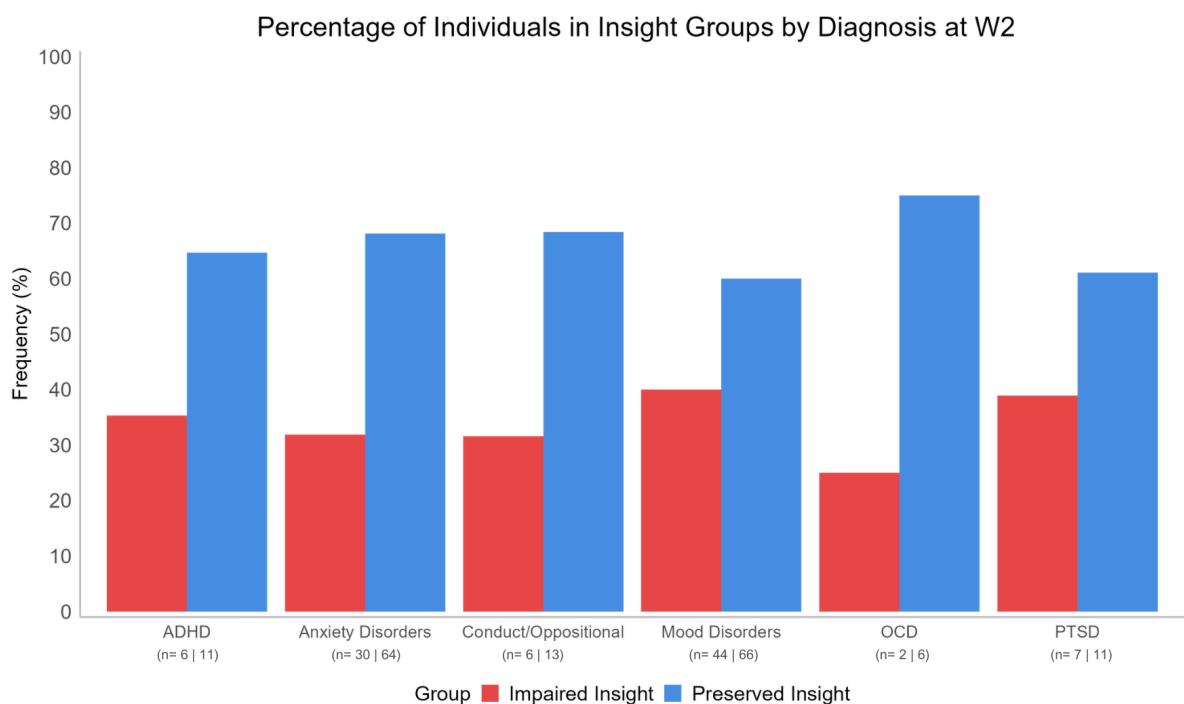
Legend: n = Impaired Insight|Preserved Insight. ADHD: Attention-Deficit/Hyperactivity Disorder; DMDD:

Disruptive Mood Dysregulation Disorder; OCD: Obsessive-Compulsive Disorder; PTSD: Post-Traumatic Stress Disorder.

The diagnostic distribution at W2 can be seen in Figure 3, showing the percentage of individuals in each insight group. At W2, also no significant association between diagnoses and insight groups was found ($\chi^2 = 2.09$, $df = 5$, $p = .836$) at W1.

Figure 3

Percentage of Individuals in Insight Groups by Diagnosis at W2.

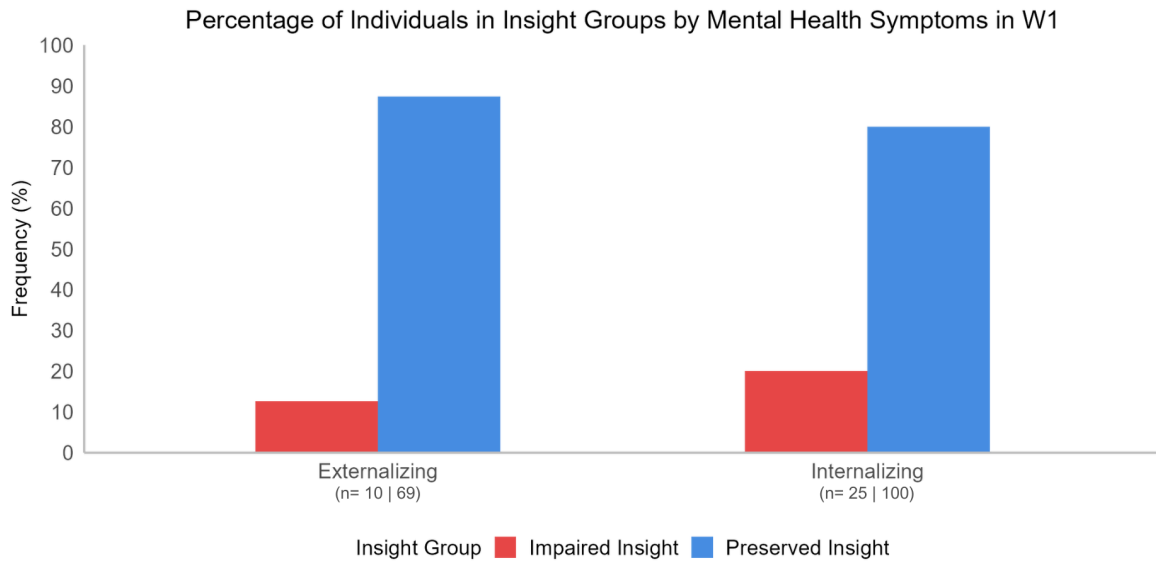


Legenda: n = Impaired Insight | Preserved Insight. ADHD: Attention-Deficit/Hyperactivity Disorder; DMDD: Disruptive Mood Dysregulation Disorder; OCD: Obsessive-Compulsive Disorder; PTSD: Post-Traumatic Stress Disorder.

The distribution of individuals across insight groups was also analyzed based on mental health symptoms, specifically internalizing and externalizing symptoms. The distribution of individuals within each insight group in relation to mental health symptoms are presented in Figure 4 for W1 and Figure 5 for W2. There was no significant association between type of mental health symptoms and insight at W1 ($\chi^2 = 1.36$, $df = 1$, $p = .245$) or W2 ($\chi^2 = 1.$, $df = 1$, $p = .245$).

Figure 4

Percentage of Individuals in Insight Group

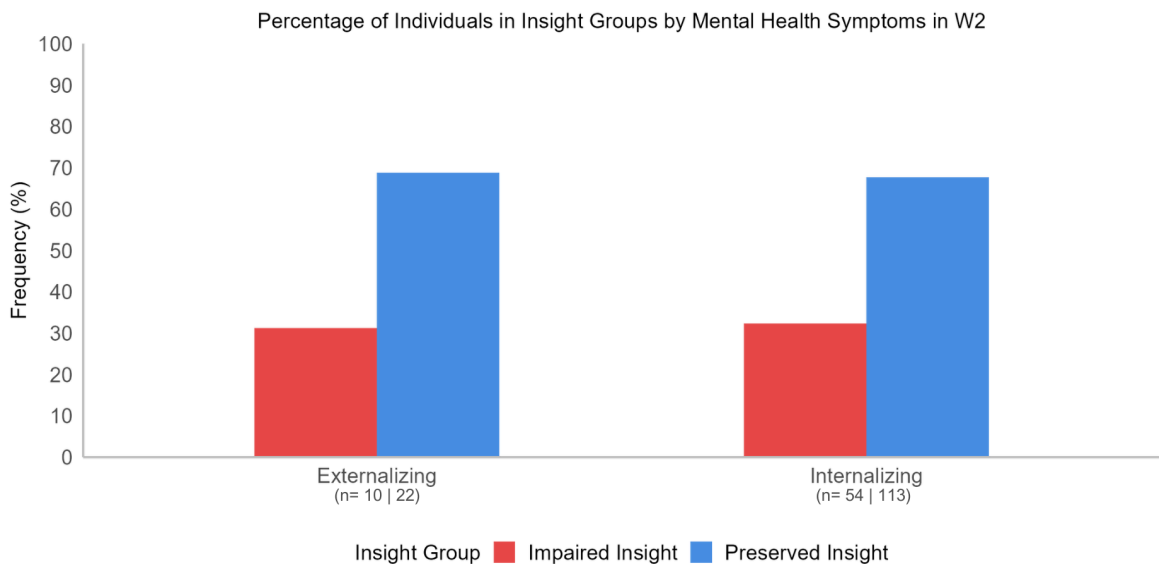


ps

Legend: n = Impaired Insight | Preserved Insight

Figure 5

Percentage of Individuals in Insight Groups According to Mental Health Symptoms at W2.



Legend: n = Impaired Insight | Preserved Insight

Discussion

In our study, most children and adolescents had a preserved insight. However, in the

second wave, individuals with multiple diagnoses were more likely to be in the impaired insight group. At W1, age was positively associated with insight, with older individuals showing a higher likelihood of being in the preserved insight group. Stress also increased the likelihood of presenting a preserved insight at W1, but this effect reversed at W2, where individuals with higher levels of stress were more likely to have impaired insight. Across diagnoses, individuals were more often in the preserved insight group, and no significant differences were found between the insight groups regarding internalizing or externalizing symptoms.

Insight remains a condition that is still underexplored in childhood and adolescence. Some studies, primarily focused on OCD and schizophrenia, have found that children and adolescents often exhibit impaired insight (Adelman & Lebowitz, 2012; Geller, 2006; Nissen & Parner, 2018; Parellada et al., 2009). Given the early stages of development and the ongoing maturation of cognitive processes, which may limit self-awareness, we also anticipated a higher prevalence of impaired insight in this population (Nikolajsen et al., 2011). By contrast, our findings showed that the majority of individuals in the sample were classified in the preserved insight group at both waves. It is important to note that our sample included only individuals with non-psychotic disorders, with a particularly high prevalence of mood disorders and anxiety disorders, both of which are more commonly associated with preserved insight in adults (Buchman-Wildbaum et al., 2020) and might have influenced our findings in this direction.

While greater insight has been associated with better treatment adherence and improved clinical outcomes, it is estimated that 80% of children and adolescents in Brazil do not receive any assistance (Fatori et al., 2019). Additionally, increased insight has been associated with increased psychological distress (García-Mieres et al., 2020; Lysaker et al., 2018), a phenomenon known as the "insight paradox," which presents a challenge in determining how to address insight in a way that enhances mental health outcomes. In this study, elevated stress was positively associated with preserved insight at W1, consistent with prior research that connects greater insight with greater emotional distress (García-Mieres et al., 2020; Park et al., 2024). In contrast, at W2, the effect was reversed, with stress showing a positive association with impaired insight. We did not find studies addressing this shift, but it is possible that the relationship between insight and stress is mediated by other factors and impacted by development.

Some studies examined factors associated with insight. Research indicates a

relationship between poor insight and neurocognitive factors (Aleman et al., 2006; Hornberger et al., 2014) suggesting that this condition may arise from alterations in brain mechanisms. Others discuss social and psychological aspects, such as parental factors (Macgregor et al., 2015) and stigma (Pruß et al., 2012), or whether insight serves as a coping mechanism in response to mental health challenges (Lysaker et al., 2003). In our study, we explored life factors associated with insight and found that, at W1, age had a significant effect, with older individuals being less likely to have impaired insight. This finding aligns with a previous study, which suggests that insight tends to improve with age (Nikolajsen et al., 2011). We also examined whether insight differed between individuals with a single diagnosis and those with comorbid conditions (two or more diagnoses). In the first wave, regardless of the number of diagnoses, there was a higher number of individuals in the preserved insight group. However, at the second wave, we observed a shift: individuals with multiple diagnoses were more frequently categorized in the impaired insight group compared to those with a single diagnosis, with the distribution being nearly equal between groups. Individuals with multiple diagnoses may experience increased illness severity due to a higher symptom burden during development, which is aligned with research identifying illness severity as a key risk factor for impaired insight (Lysaker et al., 2018).

In our study, there was no significant difference in the likelihood of having preserved or impaired insight across any diagnostic category, with the majority of individuals in the preserved insight group. Our findings are consistent with the literature, which links mood disorders, particularly depression (Camelo et al., 2019; Lee et al., 2010; Silva et al., 2015) and anxiety disorders (Buchman-Wildbaum et al., 2020; Halaj & Huppert, 2022), with preserved insight. On the other hand, OCD has been linked to impaired insight in some studies (Adelman & Lebowitz, 2012; Geller, 2006; Lewin et al., 2010), which was not observed in our study. This may suggest a difference in the severity of symptoms within our sample, which is population-based rather than clinical, indicating that impaired insight in OCD may be related to the severity of the condition, as discussed by (Gan et al., 2022). We did not identify any studies examining insight in ADHD, conduct disorder, or oppositional defiant disorder. We found only one study exploring the relationship between insight and PTSD (Yanos et al., 2016), but it primarily focused on individuals with severe mental illness and prominent psychotic symptoms alongside PTSD, which does not align with our sample. We also analyzed insight concerning a broader category of internalizing and externalizing disorders, but found no differences between these categories regarding the likelihood of being

in a specific insight group.

Conclusions

To our knowledge, this is the first study to investigate insight in a population sample of children and adolescents in Brazil. It is also one of the most comprehensive studies, in terms of multiple conditions investigated, on insight in children and adolescents. We observed a higher frequency of children and adolescents with preserved insight, which may be attributed to the profile of our sample, predominantly including non-psychotic disorders, especially mood and anxiety disorders. Additionally, we observed an increase in impaired insight for multiple diagnosis during development, which may indicate a relation between insight and severity of illness. Regarding life factors associated with insight, our findings on age are consistent with existing literature. However, while stress showed a similar pattern at W1, it presented a conflicting result at W2.

Our study has some limitations. Only a subsample had data available to estimate insight, which may have limited our investigation of life factors due to the smaller sample size. Additionally, despite having longitudinal data, we were only able to conduct cross-sectional analyses because of the number of participants in the groups. Another limitation is that we could only assess insight as a binary variable due to the absence of a specific instrument in our sample. Most research has studied insight as a continuous variable, which may provide a deeper understanding of this construct and its implications for mental health conditions. Finally, we were unable to investigate insight in psychotic disorders due to the insufficient number of participants with these conditions in our sample. Despite these limitations, we believe this study makes a significant contribution to the field, particularly by examining it in a population-based sample of children and adolescents.

While impaired insight is often linked to poorer treatment adherence and worse clinical outcomes, preserved insight has also been associated with increased psychological burden, highlighting the complexity of its role in mental health. Further research is needed to better understand how insight interacts with different psychopathological profiles and its implications for treatment and well-being. Mental health services for this population remain scarce in Brazil and worldwide, with a lack of structured programs to address early intervention and long-term care. It is important to highlight that although most children and

adolescents in our community sample had preserved insight, it is estimated that around 80% of children and adolescents do not receive any assistance in Brazil. This gap underscores the urgent need for policies and initiatives that expand access to mental health support, especially in early development stages.

Future research should continue exploring this topic outside clinical settings and in early developmental stages to better understand insight before the worsening of mental health conditions. Such investigations may help inform the development of early prevention strategies, such as school-based interventions, to reduce the burden of mental health disorders during childhood and adolescence.

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Supplementary Material

Table S1

Correlation Matrix of SE Section Items in Applause

Correlation Matrix of SE Section Items in Applause					
	Item 1	Item 2	Item 3	Item 4	Item 5
Item 1	1.00	0.10	0.34	-0.14	-0.31
Item 2	0.10	1.00	0.01	0.04	-0.01
Item 3	0.34	0.01	1.00	-0.05	-0.17
Item 4	-0.14	0.04	-0.05	1.00	0.46
Item 5	-0.31	-0.01	-0.17	0.46	1.00

Legend - SE Section: Measures self-identification as having a mental illness. Item 1 - Current issues I am facing could be the first signs of a mental illness; Item 2 - The thought of myself having a mental illness seems doubtful to me; Item 3 - I could be the type of person that is likely to have a mental illness; Item 4 -I see myself as a person that is mentally healthy and emotionally stable; Item 5 - I am mentally stable, I do not have a mental health problem.

3 GENERAL DISCUSSION

This study examined the prevalence of DEB and their trajectory over time, along with their relationship with psychopathologies in children and adolescents from the BRHC. Additionally, we explored the level of insight in these individuals and its variation based on diagnoses and psychopathological symptoms.

In Article 1, we investigated the prevalence of DEB, its trajectory over time, and associations with psychopathology in children and adolescents. We observed a DEB prevalence of 12.1% at baseline, 9.8% at W1, and 12% at W2. The longitudinal incidence of DEB was highly variable, with most individuals showing changes over time. We classified this variability according to different patterns over time, as incident, transient, remitting, and persistent. Additionally, we analyzed age, sex, and SES as risk factors for DEB. Age and sex were found to be significant factors, with the risk of DEB increasing as individuals got older and girls being more likely to develop it than boys. Regarding SES, lower scores were associated with a higher risk of DEB. Finally, in relation to mental health diagnoses, DEB showed a strong association with higher levels of internalizing symptoms, particularly in girls, while there was a weaker connection to externalizing behaviors. DEB also increased the likelihood of developing EDs, MDD, and a higher BMI, but had no significant effect on generalized disorder anxiety or Attention-Deficit/Hyperactivity Disorder (ADHD).

In Article 2, the level of insight was investigated as a binary variable, categorizing children and adolescents into two groups: impaired insight and preserved insight. The majority of our sample exhibited preserved insight, with only individuals with multiple diagnoses showing a higher frequency of impaired insight at W2. We found that age influenced insight, with older individuals being more likely to have preserved insight at W1; however, this association did not persist at W2. Stress was associated with insight in both waves, though its effect was inconsistent. At W1, stress was linked to a higher likelihood of preserved insight, while at W2, it was associated with a greater chance of impaired insight. We also explored insight concerning diagnoses and mental health symptoms. For

all diagnoses — including anxiety disorders, ADHD, Mood Disorders, Oppositional and Conduct Disorders, OCD, and Post-Traumatic Stress Disorder — we observed the same pattern, with more individuals in the preserved insight group. No significant differences were found regarding the likelihood of being in the impaired or preserved insight group when examining internalizing and externalizing symptoms.

Mental health problems have a significant impact on children and adolescents (Guthold et al., 2023), which reinforces the importance of studying them and the associated factors in order to improve access to appropriate treatment and strengthen protective measures. At the beginning of this research, one of its main objectives was to examine whether DEB was correlated with insight (impaired or preserved), viewing DEB as a maladaptive coping mechanism for managing mental health challenges. However, due to the limited number of individuals with available data from the Applause questionnaire and diagnoses, combined with the relatively low frequency of DEB in this sample, the statistical power of our analysis was limited.

Although this relationship could not be investigated, both articles share an important common focus: mental health-related issues in children and adolescents. Previous studies have shown that DEB are linked to increased mental health issues and have a negative impact on well-being and quality of life (Herpertz-Dahlmann et al., 2008; Puccio et al., 2016). At the same time, research on insight in non-psychotic disorders has been growing (Konstantakopoulos, 2019), emphasizing the importance of understanding its role in mental health conditions. Expanding knowledge about factors that influence the onset of mental health issues and clinical outcomes is important for improving treatment and prognosis.

The study on DEB contributes to a deeper understanding of the condition in Brazilian children and adolescents, as few studies have explored this topic using a population sample, especially with longitudinal data. We reported a slightly lower prevalence of DEB compared to other studies (Leal et al., 2020; Lopes et al., 2016; López-Gil et al., 2023), but it remains relatively high,

particularly when compared to the prevalence of EDs. Although DEB is not a formal diagnosis, it involves emotional distress and impairment in daily life (Wade et al., 2012), emphasizing the need for it to be addressed. Additionally, the variability in DEB incidence over time suggests a need to better understand life factors that may mediate its occurrence. The results also reinforce the link between DEB and psychopathologies, which may indicate a necessity of approaching eating behaviors when investigating mental health problems, especially in early developmental stages, for example, in the context of school programs and interventions. Our study also supports a factor already highlighted in the literature: girls are more likely to have eating problems than boys (De Matos et al., 2021; López-Gil et al., 2023; Vlachakis & Vlachakis, 2014). This highlights the need to understand factors that may be linked to this, as body image concerns, which particularly affect the female sex.

Regarding the results on insight, an important point of discussion is the high number of children and adolescents with preserved insight, independent of the specific diagnosis. Given the ongoing emotional and cognitive maturation at this age, it is generally assumed that children and adolescents have limited awareness of their problems, which may also affect their ability to cope with them. However, in our sample, we found that they are more likely to recognize the mental health issues they are facing. In contrast, it is known that access to mental healthcare in Brazil is very limited, which creates a barrier to treatment (Fatori et al., 2019). Preserved insight has also been associated with psychological distress, depression, and suicidality, highlighting its importance as a factor to consider when addressing mental health issues (García-Mieres et al., 2020; Lysaker et al., 2018). These findings highlight the need to improve mental health care in Brazil, not only in specialized centers but also through programs that reach a broader public, such as school interventions.

We had some limitations for both articles. We worked with a cohort sample that was relatively large, but we used a smaller sample due to the limited availability of measures related to our variables of interest, which had a more significant impact on the insight study. Another limitation was that we used an

indirect measurement for estimating DEB and insight. However, in both studies, we employed statistical analysis to validate our approach. We assessed DEB and insight as categorical variables; however, exploring them on a continuum could provide a more nuanced understanding of their characteristics and impact. Although we had longitudinal data, we were unable to analyze insight over time due to the limited sample size.

Despite the limitations, we believe this study can contribute to expanding knowledge not only on the specific issues of DEB and insight but also on mental health more broadly. This is particularly relevant because the study was based on a population sample, in contrast to the majority of studies that focus on clinical settings. This approach helps broaden our understanding of these issues and provides data that can be more widely applicable to the general population of this age group. Conducted in a low-middle-income country, the research is also important for raising awareness of mental health problems in regions with limited access to healthcare (Fatori et al., 2019). By providing data from a non-clinical population, we can enhance the overall understanding of factors associated with mental health and clinical conditions that remain untreated, either due to limited access or lower severity, which may eventually lead to a clinical setting. It can also contribute to informing mental health prevention measures, especially for children and adolescents.

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