Socialization problems in adolescents: a convergent parallel mixed-methods study

Problemas de sociabilidade em adolescentes: um estudo de métodos mistos paralelo convergente

Problemas de sociabilidad en adolescentes: estudio de métodos mixtos paralelo y convergente

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ABSTRACT
Objective: to analyze socialization problems experienced by adolescents aged from 12 to 18 years old in a Brazilian capital city. **Method:** a convergent parallel mixed-methods study, with quantitative data collected using the Youth Self-Report instrument and qualitative data obtained through interviews based on items from this instrument. The quantitative analysis included descriptive and inferential tests, while the qualitative data were examined through thematic analysis, guided by the Simmelian concept of sociability. All ethical aspects were duly observed. **Results:** it was found that 15.4% of the adolescents presented socialization problems, with higher prevalence among girls and in the 11-14 age group. The qualitative accounts revealed feelings of loneliness, social rejection and interpersonal difficulties. Data integration highlighted the complexity of the demands at this life stage. **Conclusion:** adolescents experience significant socialization problems, reinforcing the need for interventions aimed at strengthening socioemotional skills and promoting inclusive school environments.
Descriptors: Mental Health; Adolescent; Social Behavior.

RESUMO
Objetivo: analisar os problemas de sociabilidade enfrentados por adolescentes de 12 a 18 anos de uma capital brasileira. **Método:** estudo de métodos mistos paralelo convergente, com dados quantitativos coletados por meio do instrumento Youth Self-Report e qualitativos obtidos em entrevistas baseadas nos itens desse instrumento. A análise quantitativa incluiu testes descritivos e inferenciais, enquanto os dados qualitativos foram examinados por análise temática, orientada pela concepção de sociabilidade simmeliana. Aspectos éticos foram respeitados. **Resultados**: identificou-se que 15,4% dos adolescentes apresentaram problemas de sociabilidade, com maior prevalência em meninas e na faixa etária de 11 a 14 anos. Os relatos qualitativos evidenciaram sentimentos de solidão, rejeição social e dificuldades interpessoais. A integração dos dados evidenciou a complexidade das demandas nessa fase da vida. **Conclusão:** adolescentes vivenciam problemas significativos de sociabilidade, reforçando a necessidade de intervenções voltadas ao fortalecimento das habilidades socioemocionais e à promoção de ambientes escolares inclusivos**.**
Descritores: Saúde Mental; Adolescente; Comportamento Social.

RESUMEN
Objetivo: analizar los problemas de sociabilidad enfrentados por adolescentes de 12 a 18 años de una capital brasileña. **Método:** estudio de métodos mixtos paralelo y convergente, con datos cuantitativos recolectados mediante el instrumento *Youth Self-Report* y datos cualitativos obtenidos a partir de entrevistas basadas en los ítems de dicho instrumento. El análisis cuantitativo incluyó pruebas descriptivas e inferenciales, mientras que los datos cualitativos se examinaron mediante análisis temático, orientado por la concepción simmeliana de la sociabilidad. Se respetaron los aspectos éticos. **Resultados:** se identificó que el 15,4% de los adolescentes presentó problemas de sociabilidad, con mayor prevalencia en niñas y en el grupo etario de 11 a 14 años. Los relatos cualitativos evidenciaron sentimientos de soledad, rechazo social y dificultades interpersonales. La integración de los datos puso de manifiesto la complejidad de las demandas en esta etapa de la vida. **Conclusión:** los adolescentes experimentan significativos problemas de sociabilidad, lo que refuerza la necesidad de intervenciones orientadas a fortalecer las habilidades socioemocionales y a promover entornos escolares inclusivos.
Descriptores: Salud Mental; Adolescente; Conducta Social.

INTRODUCTION

According to Georg Simmel, society is comprised by the set of interactions among individuals, described as *sociation*[1]. These interactions are distinguished by their "form" (the way individuals relate to one another) and their "content" (instincts, interests, impulses and objectives). For Simmel, sociability represents the playful form of association, in which people come together for the simple pleasure of being together, without material or instrumental purposes[1,2]. This concept highlights sociability as a space of pure, creative interaction, free from practical interests and essential to the human experience. It provides an important theoretical foundation for understanding interpersonal interactions and their relevance in everyday life, in which the pleasure of relating assumes a central role in social relationships[1].

In contemporary scholarship, the theoretical lenses applied to the phenomenon of sociability have expanded Simmel's classical concept[1] rather than opposing it. While Simmel[1] defined sociability as the playful and pure form of association, centered on the pleasure of interaction, more recent studies seek to contextualize this form of interaction in relation to variables such as gender, age and social class. In the sociological field, sociability is linked to social life and to the relational and situational character of different individuals and groups within urban contexts[3]. Leite[4] complements this perspective by understanding sociability as interactive, representative and symbolic processes related to life experiences that shape interactions.

Adolescence is recognized as a phase of intense sociability, characterized both by the active pursuit of social interactions and by experiences of loneliness. Through these interactions, adolescents undergo the socialization process assimilating habits, behaviors, values and beliefs that structure the society in which they live. Acceptance by peers, presence of a few but genuine close friends and secure love of an affectionate family constitute fundamental requirements for interpersonal maturation. In this context, the school emerges as an essential space for the promotion of sociability, providing an environment that can foster the construction of healthy bonds and social adjustment, with a positive impact on mental well-being and academic outcomes[5].

Adolescence is also a crucial period for maintaining and developing emotional, cognitive and social attributes that are important for mental well-being, encompassing needs that are strongly linked to sociability[6]. Social experiences throughout adolescence are not only predictive of mental health and the near future but are also part of a series of cascading developmental and risk processes that, at least in part, are driven by earlier biological and psychosocial changes. Through such interactions, this dynamic system may increase or buffer the risk of psychological distress[7].

However, socialization problems may emerge during this phase, compromising interaction skills and the creation of interpersonal bonds. Such problems are associated with emotional dependence, feelings of rejection and communication difficulties[8]. Their prevalence varies across clinical classifications and cultures, as shown by international studies using the Youth Self-Report (YSR): 17.6% in Nepal and 10.6% among girls in Poland[9,10]. Moreover, these problems are related to low self-esteem, dissatisfaction with body image and internalizing behaviors, such as anxiety and depression[11,12].

In Brazil, the literature on socialization problems among adolescents and their impacts remains scarce. A recent study conducted with adolescents in Cuiabá, Mato Grosso, identified marked socialization difficulties in the COVID-19 pandemic context, highlighting the relevance of investigating this issue in specific settings[13].

Therefore, understanding socialization problems in adolescents is essential to support effective interventions and to promote social inclusion and emotional well-being in this group. This study aims at analyzing socialization problems experienced by adolescents aged from 12 to 18 years old in a Brazilian capital city, using a convergent parallel mixed-methods design. The quantitative phase sought to identify the prevalence and levels of socialization problems using the YSR instrument[8], while the qualitative phase aimed at deepening understanding about the adolescents' perceptions and experiences related to these problems, based on items from the Socialization Problems subscale. Through data integration, grounded in Georg Simmel's perspective on sociability[1], this study seeks to reveal the dynamics underlying adolescents' difficulties and potentialities in sociability, thereby providing a more comprehensive understanding to inform intervention strategies.

METHOD

This was a convergent parallel mixed-methods study. Quantitative and qualitative data were collected simultaneously, analyzed separately and merged during the interpretation of the results. This approach was chosen for its ability to explore complex phenomena such as socialization problems by combining complementary numerical and narrative perspectives[14].

Data collection was conducted in seven state public schools from Cuiabá, Mato Grosso, selected by convenience due to their proximity to the researchers' Higher Education institution and with the principals' consent between March 2021 and November 2022, corresponding to the period of visits to the participating schools. Located in the eastern and western regions of the city, the schools serve students from sixth grade of Elementary School to the third year of High School. Cuiabá was selected not only for its logistical feasibility but also due to the scarcity of research on adolescents' mental health and sociability in the Brazilian Midwest region, which is characterized by socioeconomic inequalities, cultural diversity and rapid urban growth —factors that may influence sociability experiences.

The target population consisted of adolescents aged from 12 to 18 years old regularly enrolled in the participating schools. Based on UNICEF data on mental disorders among adolescents, a sample size calculation was performed using a 95% confidence level, a 5% margin of error and an estimated proportion of 17.1%, indicating a required sample of 218 participants. Approximately 1,200 students were invited; of these, 250 returned signed Informed Consent Forms (ICFs) and Assent Forms (AFs), resulting in 222 effective participants. The response rate was 18.5%.

Recruitment took place in two stages. In the first one, the research team presented the study in classrooms to eligible adolescents, at which time the ICFs were delivered to be taken to the parents or legal guardians. The students were offered guidance regarding the form content and the need to return it signed. In the second stage, previously scheduled, the signed ICFs were collected. Only adolescents who returned the signed documents were invited to proceed to the assent stage. The Assent Form was then presented individually, read and explained in a private setting. Assent was audio-recorded immediately prior to each interview, ensuring privacy and full understanding of the information provided.

Sampling was voluntary (non-probability) and all eligible adolescents from the participating schools were invited. Only those who presented ICFs signed by their legal guardians and provided recorded assent were included in the study.

It is important to note that the researchers had established prior rapport with the participants as a result of previous research presentations, classroom lectures, guidance on mental health topics, assistance with registration for the National High School Examination and support in obtaining voter registration. This prior rapport was intended to ease the adolescents' engagement, foster trust and promote a better understanding of the study objectives, without interfering in the voluntary nature of their participation.

In each class, the mean time between presentation of the study—when the adolescents were handed in the ICFs to take to their guardians—and actual data collection was approximately three days. The interviews were conducted individually in private rooms at the schools by two research team members. The team consisted of the project coordinator, a professor with a PhD degree, a PhD student in Nursing and four undergraduate research students. All team members received specific training, including standardization of interview techniques, guidance on managing sensitive situations, strategies to ensure privacy and confidentiality and detailed instructions on appropriate data recording. There was no systematic repetition of interviews.

The quantitative data were collected using the Youth Self-Report (YSR) instrument[8], in its Brazilian version[15], adapted for administration via Google Forms®. YSR was selected due to its widespread international use and validation in Brazil, ensuring comparability[15]. For this study, the Socialization Problems subscale was used, consisting of 11 items, in line with the thematic focus. The decision not to include reports from parents or teachers was based on the intrapersonal nature of sociability, considered a subjective experience best captured through the adolescents' self-reports.

In addition to YSR scores, sociodemographic data were collected, including gender (female, male and other), age group (11-14 years old and 15-18 years old) and monthly family income (less than one minimum wage; from one to five minimum wages; from six to ten minimum wages; and more than ten minimum wages). The "race/skin color" variable was also included in the form, although its subsequent use depended on the data analysis stage.

Parallel to quantitative data collection, qualitative interviews were conducted. A total of 34 adolescents with borderline or clinical scores were interviewed, a criterion adopted to capture more salient experiences of socialization difficulties. Each interview lasted a mean of 15 minutes. During this stage, the adolescents were invited to elaborate on positive answers from the subscale through open-ended questions initiated with prompts such as "Tell me more about this…", easing exploration of the reported experiences.

The items that received qualitative elaboration included those in which the participants indicated behaviors or feelings such as feeling very dependent, sensations of loneliness, not getting along with others, experiencing jealousy or envy, feeling persecuted, accidental self-injuries, believing that others do not like them, frequent yelling, feeling clumsy, preferring the company of younger children and having speech problems. These items served as starting points for the adolescents to narrate concrete situations from their everyday lives, allowing understanding nuances and meanings attributed to these experiences.

The quantitative data analysis included descriptive statistics and classification into three categories: normative ($T<60$), borderline ($T=60-63$) and clinical ($T>63$)[15]. Distribution normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests, which indicated non-normal distributions. Accordingly, non-parametric tests were applied, specifically the Mann-Whitney U test for comparisons between two groups and the Kruskal-Wallis test for comparisons among three or more groups.

The missing data were examined prior to analysis. The "race/skin color" variable presented a high non-response proportion, which precluded including it in the analyses. As there was no methodologically reliable possibility for imputation, this variable was excluded to avoid bias and ensure consistency in the results.

The qualitative analysis was conducted using Thematic Analysis (TA), as proposed by Braun and Clarke[16]. Georg Simmel's perspective on sociability was adopted as the theoretical lens to guide interpretation of the adolescents' interactions and interpersonal difficulties[1].

During the data familiarization phase[16], the audio recordings were transcribed and reviewed and the researchers conducted repeated readings of the dataset to identify initial ideas related to sociability. In the coding phase, patterns were identified in the narratives, such as "feelings of rejection". These codes were systematically organized and linked to specific transcript segments. For example, the statement reading "There are many people who don't like me, like, 95% of the school […]" was coded as "social rejection".

In the subsequent phase, the codes were grouped into potential topics encompassing specific subtopics, such as "Loneliness and feelings of exclusion", "Severe self-criticism and social comparison" and "Aggressiveness and interpersonal conflicts". During the review phase, the topics were examined for coherence and scope and adjusted to ensure accurate reflection of the data collected. For instance, the "Jealousy and possessiveness" subtopic was consolidated within the "Relational challenges" topic.

Finally, the topics were clearly defined and named based on the patterns identified and the narratives the data sought to convey. Representative excerpts were selected to illustrate topics, such as the "I feel a little more jealousy […]" statement, used to exemplify the "Jealousy and possessiveness" subtopic. This final stage culminated in the production of the qualitative scientific report[16].

To identify excerpts in the results, a coding system was used consisting of an alphanumeric code for each participant (Ad1, Ad2, Ad3…), followed by the T-score, gender and age, presented in the following format: (AdX; T-score XX.XX; gender; age). Illustrative excerpts were selected based on representativeness and thematic density, prioritizing statements that clearly expressed the meaning patterns identified and contributed to the analytical understanding of each topic.

The quantitative and qualitative data were integrated from the study design stage, based on an intraprocedural integration approach. The qualitative interviews were structured according to the quantitative results obtained from YSR, enabling open-ended questions to be directed toward an in-depth exploration of the socialization problems identified. This strategy ensured a direct connection between both approaches, allowing the qualitative findings to complement and contextualize the quantitative results through narratives. Presented in a thematic matrix, merging of the findings highlighted convergences and divergences, revealing both general patterns and individual nuances that could not be captured by a single method.

This integration strengthened the analysis by aligning the quantitative and qualitative perspectives, while application of Georg Simmel's principles of sociability[1] provided the conceptual framework necessary to understand how adolescents experience their social associations and confront interaction challenges.

Rigor was ensured by using a validated instrument in the quantitative component, appropriate statistical analyses and systematic criteria in qualitative analysis. In the qualitative component, two researchers independently coded the data, compared the results and discussed discrepancies until consensus was reached. Integration included a reanalysis of the transcripts after the initial definition of topics, reinforcing interpretive consistency. The researchers' subjectivity was considered a potential limitation; to mitigate this risk, reflexive diaries were used and meetings were held to discuss the findings. These strategies enhanced interpretive validity and transparency of the analytical process. The Mixed-Methods Appraisal Tool (MMAT) was used as a reference for preparing the scientific report, aiming to ensure methodological quality[18].

The ChatGPT Pro® (version 5.2) AI language model was used to assist in editing and spelling review. This tool was employed to improve manuscript clarity and readability. The authors retain full responsibility for the paper's content and integrity.

The study fully complied with the ethical and scientific requirements established by Resolution No. 466/2012 of the Brazilian National Health Council, with approval from a Research Ethics Committee and institutional authorization from the participating school system. Informed consent was obtained from the legal guardians and assent was obtained from the adolescents. The participants who reported significant emotional distress were referred to specialized psychosocial care services, in coordination with school administrators and legal guardians.

RESULTS

A total of 222 adolescents took part in the study; most of them were female (n=150; 67.6%), followed by male participants (n=71; 32.0%) and those who identified as other (n=1; 0.5%). Regarding age group, 56.8% were aged from 15 to 18 years old (n=126), while 43.2% were aged between 11 and 14 years old (n=96).

With respect to monthly family income, most families (81.1%, n=180) reported earnings between one and five minimum wages (MWs), characterizing a lower-middle-income profile. Only 5.0% (n=11) reported incomes below one minimum wage, whereas 11.7% (n=26) reported incomes between six and ten minimum wages and 2.3% (n=5) reported incomes above ten minimum wages.

Quantitative results

The mean T-score for socialization problems was 50.00 (±10.00), with values ranging from 30.30 to 80.24. This finding indicates that most adolescents fell within the normative range of sociability. The majority of the adolescents assessed (84.7%) were classified in the normative category, indicating absence of significant socialization problems. In contrast, 4.1% of the adolescents were classified in the borderline category and 11.3% in the clinical category, indicating socialization problems that may require greater attention and targeted interventions.

Table 1 presents the results of the statistical analyses comparing socialization problem scores (T-scores) across the gender, age group and family income independent variables.

Table 1: Socialization problems among adolescents according to gender, age group and family income (n=222). Cuiabá, MT, Brazil, 2022.

Variables	n	Mean T-score	Minimum	Maximum	p-value
Gender (n=221)					
Female	150	52.30	30.30	80.24	
Male	71	48.75	31.00	70.00	0.000*
Age group (n=222)					
11-14 years old	96	54.10	35.00	80.24	
15-18 years old	126	47.90	30.30	70.00	0.002*
Family income (n=222)					
<1 MW	11	55.00	45.00	75.00	
1-5 MWs	180	50.20	30.30	80.24	
6-10 MWs	26	48.50	35.00	70.00	
>10 MWs	5	60.10	50.00	65.00	0.530**

Notes: *Mann-Whitney U test; *Kruskal-Wallis test; MW = Minimum Wage.

The results indicate statistically significant differences in socialization problem scores between the genders (p=0.000), with female adolescents presenting higher mean scores (52.30) when compared to their male counterparts (48.75). Regarding age group, adolescents aged from 11 to 14 years old showed higher mean scores (54.10) than those between the ages of 15 and 18 (47.90), also with a statistically significant difference (p=0.002). As for family income, although adolescents from families earning more than ten minimum wages presented the highest mean score (60.10), the differences among income groups were not statistically significant (p=0.530).

Qualitative results

The qualitative analysis of the interview *corpus* resulted in three topics: *Difficulties creating and maintaining social bonds*; *Low self-esteem and insecurity: impacts on adolescents' sociability*; and *Relational challenges: dealing with conflicts, jealousy and adaptation to coexistence*, which are presented below.

Topic 1. Difficulties creating and maintaining social bonds

The analysis of the adolescents' accounts revealed feelings of loneliness, even when they were embedded in social groups. The narratives expressed anguish associated with loneliness, accompanied by a longing for connection and belonging, highlighting the sense of emptiness and incompleteness that lack of social interaction can generate. Sociability represents a playful form of association; however, for these adolescents, absence of social interaction reflects a deviation from this basic principle, intensifying emotional isolation:

> *"I'm afraid of feeling lonely. Sometimes I need a hug, someone to talk to [...]. There's no one there; I feel empty, sad, alone." (Ad1; T-score 53.95; male; 14 years old).*

Difficulties creating meaningful bonds and experiencing emotional emptiness broadened the adolescents' perceptions of isolation. This experience oftentimes translated into feelings of sadness and helplessness. When weakened, sociability, which is sustained by reciprocity and mutual interaction, resulted in the erosion of interpersonal connections and the strengthening of a sense of exclusion:

> "Oh, a lot! Like, sometimes I'm here in a group of people and then when the conversation stops and I move away, I see that no one comes to check how I'm doing, you know? Then I feel very alone." (Ad2; T-score 56.58; female; 14 years old).

> "I don't like being alone; I feel sad." (Ad3; T-score 43.44; male; 14 years old).

Although seemingly contradictory to the need for connection, the pursuit of solitude also emerged in the adolescents' accounts. Some participants sought refuge in moments of solitude to cope with social demands and find certain balance between social and individual life. By valuing their own company, the adolescents demonstrated self-sufficiency and a search for self-knowledge—hallmark characteristics of this developmental stage. This behavior may be understood as an attempt to find balance within a social system that oftentimes overwhelms them, as illustrated in the excerpts below:

> "At home, I stay alone because I'm in peace; I stay kind of quiet, you know?" (Ad4; T-score 48.70; male; 13 years old).

Marked by the perception of constant judgment, social anxiety also emerged as a significant factor. The following account reflects a deviation from the basic principles of sociability, whereby the pleasure of interaction is replaced by fear of judgment, hindering the creation of healthy bonds:

> "I believe everyone judges me, in a subtle way. I don't know why, but wherever I go, it feels like everyone's watching me, and that bothers me." (Ad6; T-score 43.44; female; 13 years old).

Both in the school environment and online, bullying emerged as another factor contributing to the adolescents' difficulties with sociability. Reports of repeated verbal harassment indicated a pattern of hostile behaviors by peers. The creation of fake profiles further evidenced the migration of bullying to the virtual environment, expanding reach and impact of the attacks. Such practices distort sociability, transforming it from a playful space into a hostile environment that undermines interpersonal interactions:

> "[...] especially in the classroom. Last year, when they saw me, they made a vomiting sound. Wow! Then they stopped because I didn't care. But this year, they kept doing it. Wow, a lot! From this school, they created two fake profiles to attack me. Dear God, so much anger!" (Ad2; T-score 56.58; female; 14 years old).

Characterized by perceptions of not belonging to a group and of being excluded, feelings of social rejection were another recurring aspect in the adolescents' narratives. A deep desire for connection and affection contrasted with the isolation and exclusion experiences reported by many participants. Sociability only materializes when there is meaningful exchange; absence of such reciprocity intensifies feelings of exclusion and weakens interpersonal relationships:

> "There are a lot of people who don't like me, like, 95% of the school. [...] Then I keep thinking, 'How nice it would be to be loved.'" (Ad2; T-score 56.58; female; 14 years old).

Additionally, difficulties in verbal communication emerged as a challenge for many participating adolescents. Some reported stuttering, while others described difficulties finding the right words. These difficulties illustrate how communication barriers can hinder the sociability practice, which depends on the fluidity of social interactions. The perception that communication did not flow as desired generated frustration and anxiety, as evidenced below:

> "I stutter a lot; I get very nervous [...]." (Ad7; T-score 48.70; female; 13 years old).

> "[...] the right word doesn't come out and I can't manage." (Ad8; T-score 35.56; female; 11 years old).

Topic 2. Low self-esteem and insecurity: impacts on adolescents' sociability

Excessive self-criticism was one of the most recurrent aspects in the adolescents' accounts, revealing harsh self-judgment. Oftentimes influenced by external comments, this stance highlighted a negative impact on the construction of self-image and self-esteem. Some participants expressed dissatisfaction with their emotional dependence, while others pointed out how family criticism can intensify this self-criticism. Sociability depends on a balance between interaction and autonomy, and these narratives reflect certain disruption of this balance, whereby excessive self-criticism undermines the confidence required to engage in social interactions in a light and fluid manner:

> "I don't like being dependent. I am, but I don't like it. I hate being dependent on people." (Ad10; T-score 48.70; female; 13 years old).

Oftentimes associated with self-criticism, negative social comparisons also emerged as a common practice among adolescents, contributing to insecurity and difficulties in social interaction. The participants emphasized a constant perception of being judged. Such negative comparison reflects social pressures that erode the ability to experience sociability as a pleasurable and unburdened interaction. Instead, the adolescents become trapped in dynamics marked by judgment and exclusion:

"I think so, because people […] think I'm kind of too weird for them." (Ad10; T-score 48.70; female; 13 years old).

Fear of failure and the consequent avoidance of challenging situations were reported as barriers to the adolescents' social and emotional development. Some participants expressed difficulties dealing with situations that require greater autonomy, while others highlighted the need for parental validation before acting. Ideally, sociability should allow individuals to explore autonomy and interaction without fear; however, fear of failure prevents these adolescents from reaching this ideal state, limiting their opportunities for social integration.

"We can think of it like this […]. [When it's something of mine], I can [deal with it], but certain things […] that are more serious, I sometimes feel like asking older people for help." (Ad11; T-score 51.33; male; 15 years old).

"Because, like, I can't do something; […] I have to ask my mom whether she allows it or not." (Ad3; T-score 43.44; male; 14 years old).

Emotional dependence was also identified, reflecting a deep need for approval and validation from significant figures in the adolescents' lives, such as friends and family members. The participants mentioned the need for reciprocity and its impact on relationships. Emotional dependence can be interpreted as an obstacle to full sociability, as it hinders lightness and spontaneous reciprocity in interactions, transforming them into relationships marked by demands and insecurities:

"No, not from adults, but from friends, yes. My father has already said that I have strong emotional dependence, because I depend a lot on people." (Ad2; T-score 56.58; female; 14 years old).

Topic 3. Relational challenges: dealing with conflicts, jealousy and adaptation to coexistence

Aggressiveness and interpersonal conflicts emerged in the narratives as reflections of hostile interactions experienced by the adolescents, oftentimes within the school environment. These situations illustrate how aggressive behaviors contribute to intensifying conflicts and undermine social relationships. Reports of online attacks were also identified. Such hostilities represent a deviation from the principles of light and pleasurable interaction, replacing them by power and exclusion dynamics that impair coexistence.

"From this school, they created two fake accounts to send hate to me." (Ad2; T-score 56.58; female; 14 years old).

As demonstrated in the following statement, difficulties solving conflicts in a peaceful manner suggest resistance to the sociability foundations, which presuppose mutual cooperation to maintain balance in interactions. These challenges indicate how individualism and rejection of dialogue can erode possibilities for harmonious interaction and social inclusion:

"In general, I don't get along. Because I don't want to get along." (Ad12; T-score 48.70; female; 16 years old).

Jealousy and envy also emerged as relevant factors in the adolescents' relational challenges. Feelings of possessiveness and the need for control were mentioned in several accounts. One adolescent reflected on the intensity of her jealousy, while another one described jealousy as a transient feeling that nonetheless interferes in relationships. These emotions may be understood as barriers to genuine sociability, in which the pleasure of being with others is replaced by tensions and comparisons that hinder the construction of balanced relationships:

"Yeah, my jealousy level varies, but it can get pretty intense." (Ad13; T-score 38.19; female; 17 years old).

"I feel a little more jealousy, like that. But it's something that hits at the moment and then goes away." (Ad14; T-score 59.21; male; 17 years old).

There were also reports of challenging behaviors in the school environment. Resistance to norms and rules may reflect an attempt to assert individual identity; however, when excessive, it becomes an obstacle to fluid social coexistence and group acceptance—elements that are central to sociability:

"I joke around a lot, especially in the classroom […]." (Ad2; T-score 56.58; female; 14 years old).

Integration of the results

Figure 1 presents a synthesis corresponding to the integration of the study quantitative and qualitative findings.

Topic	Quantitative Results	Qualitative Results	Meta-inferences
1	− 11.3% of the adolescents were classified in the clinical category of socialization problems. − Adolescents aged 11-14 years old had higher mean socialization problem scores (54.10) than those aged 15-18 years old (47.90), p=0.002.	− Feeling of loneliness: *"I don't like being alone; I feel sad."* − Desire for belonging and social exclusion: *"There are many people who don't like me […]."*	Younger adolescents report greater difficulty creating and maintaining social bonds, which is corroborated by higher scores in the 11-14 age group. Feelings of loneliness and social rejection may be interpreted as a deviation from Simmel's principles of sociability, in which social interaction should be light and pleasurable but is replaced by feelings of isolation and exclusion.
2	- Female adolescents presented higher mean scores (52.30) when compared to males (48.75), p=0.000.	− Low self-esteem: *"There are many people who don't like me, like, 95% of the school. […] Then I keep thinking, 'How nice it would be to be loved.'"* − Negative social comparisons: *"People think I'm kind of too weird […]."*	Reports of low self-esteem and negative social comparisons appear to be more prevalent among female adolescents, which aligns with the higher mean scores observed in this group. In these cases, self-perceptions marked by feelings of rejection and inadequacy suggest more vulnerable sociability, in which external judgments and self-criticism may influence emotional balance and the ways these adolescents integrate into groups.
3	− 84.7% of the adolescents were within the normative range, but 15.4% presented borderline or clinical levels of socialization problems.	− Interpersonal conflicts: *"From this school, they created two fake accounts to send hate to me […]."* − Difficulty solving conflicts: *"In general, I don't get along. Because I don't want to get along."*	Even among adolescents within the normative range, interpersonal conflicts and difficulties in conflict resolution reflect challenges to genuine sociability, which, according to Simmel, should promote balance in interactions. Lack of strategies to mediate conflicts and presence of persistent tensions undermine the construction of harmonious relationships.

Figure 1: Synthesis corresponding to the integration of the quantitative and qualitative data on the adolescents' socialization problems. Cuiabá, MT, Brazil, 2022.

Overall, the findings converge to deepen understanding of the socialization problems experienced by the adolescents.

DISCUSSION

The quantitative and qualitative findings of this study reveal that socialization problems among adolescents constitute a relevant and multifaceted phenomenon, marked by tensions in interpersonal relationships and significant emotional impacts. A pattern of greater vulnerability was observed among girls and younger adolescents. The qualitative analysis deepened on these issues by highlighting subtopics such as feelings of loneliness, low self-esteem, difficulties in conflict resolution and interpersonal challenges, reflecting the complexity of the problems faced by this group.

Among adolescents with higher scores, these difficulties appear to be related to the vulnerability context experienced, including emotional vulnerability resulting from contextual changes, identity development challenges and other transitions that characterize adolescence as a multifaceted process sensitive to social dynamics[18,19]. These findings can be interpreted in light of Georg Simmel's conception of sociability[1], which emphasizes it as a playful and pleasurable form of association among individuals. However, for these adolescents, the absence of reciprocal and satisfying interactions reflects certain fragility in social processes, whereby isolation and exclusion replace the ideal of lightness and mutual interaction[1].

In addition, the results indicated higher socialization problem scores among girls, which may be related not to individual or innate characteristics but to the fact that they are more frequently subjected to social expectations, surveillance and judgments that shape their interaction experiences. Previous studies indicate that such social pressures weigh more heavily on girls, influencing their self-esteem, how they perceive their relationships and how they engage in support networks[20,21]. These findings align with Simmel's perspective[1], which suggests that sociability is influenced by cultural and social factors—including gender—that shape how individuals interact and perceive their relationships. For girls, the burden of social expectations appears to intensify the challenges of creating balanced and satisfying bonds.

Reports of difficulties creating and maintaining social bonds have also been identified in previous studies, which highlight the association between insufficient interpersonal skills and feelings of exclusion or social withdrawal[22,23]. According to the literature, adolescents show higher prevalence of loneliness because their social skills are still developing and they may struggle to sustain satisfactory interpersonal relationships[24]. These findings reinforce that feelings of social rejection exacerbate not only sociability but also the adolescents' emotional well-being and self-esteem, resulting in negative psychosocial adjustment that affects social interactions during adolescence[25].

Oftentimes accompanied by self-criticism, negative social comparisons emerged as a recurrent practice among the adolescents, contributing to insecurity, a constant sense of being judged and difficulties in interaction. These patterns undermine spontaneity of their relationships and distance sociability from its light and pleasurable character, giving rise to withdrawal and exclusion dynamics. A review study indicates that stereotyped gender norms are reinforced early in life and influence how girls and boys interpret and position themselves in social interactions[26]. Social media add an extra layer to this process, exposing adolescents to idealized images, rigid aesthetic standards and public validation mechanisms that intensify social comparisons[27].

The combination of traditional norms and digital pressures amplifies feelings of inadequacy, increases self-demands and hinders spontaneous interactions, directly affecting the quality of sociability. Thus, the phenomenon is not limited to the individual level but reflects contemporary social forms that shape interactions and ways of being an adolescent. In this sense, the findings dialogue with Simmel's perspective[1] by showing that sociability is influenced by cultural norms and social contexts that structure possibilities for relationships and belonging.

Regarding relational challenges, difficulties dealing with interpersonal conflicts and aggressiveness were observed in the qualitative accounts. The presence of intense emotions such as anger and frustration is reflected in hostile behaviors. These data are consistent with the literature on interpersonal conflicts during adolescence, in which aggressiveness may represent a response to difficulties managing social interactions and coexistence expectations[28]. Such difficulties reinforce Simmel's argument[1] that sociability depends on tacit reciprocity and respect norms which, when disrupted, result in disharmonious interactions.

As shown in the narratives, the difficulty solving conflicts peacefully suggests that resistance to dialogue and cooperation may be present among many adolescents, hindering adaptation to social and school contexts. This finding also reflects studies highlighting the adolescents' difficulties negotiating interpersonal relationships, as adolescence is a phase marked by the accumulation of real-time interactions that induce feelings of discontinuity and may exacerbate social tension[29-31].

Jealousy and possessiveness issues also stood out, reflecting how insecurity and control can generate tensions in social relationships. As reported by the participants, jealousy among friends reflects the intensification of emotions and, oftentimes, difficulties establishing healthy boundaries in friendships and romantic relationships. Previous studies indicate that jealousy may reflect insecurity and a need for emotional affirmation and tends to be more pronounced in contexts of greater affective closeness, where it is oftentimes associated with fear of loss or abandonment and may lead to possessive, controlling or aggressive behaviors[32,33]. These accounts underscore how sociability can be shaped by emotional dynamics that interfere in the relational balance necessary to promote pleasurable and harmonious interactions.

Interpretation of the findings also benefits from an inter-sectional reading, in which social markers such as gender, social class and age are interdependent and produce unequal experiences within a domination matrix[34]. This framework helps explain why girls and younger adolescents present greater vulnerability in sociability processes, as their experiences are shaped by unequal social expectations, evaluative standards and opportunities for belonging. At the same time, Pierre Bourdieu's theory of capital and habitus complements this analysis by highlighting how dispositions incorporated through socialization influence ways of acting, perceiving and relating[35].

The difficulties creating bonds, sensitivity to social comparisons and perceptions of exclusion identified in this study may reflect inequalities in access to social and cultural capital, which shape forms of participation in sociability networks. Thus, integrating the contributions made by Collins and Bourdieu reveals that the adolescents' sociability challenges do not derive solely from individual characteristics but emerge from structural conditions that organize dispositions, interaction opportunities and possibilities for social recognition.

Therefore, the findings of this study reinforce the need for interventions that promote not only individual skills but also social conditions that sustain more inclusive forms of sociability, particularly for girls and younger adolescents. Socioemotional education programs can strengthen relational competencies, self-esteem and conflict

resolution, provided they are articulated with actions that expand support networks, reduce exclusionary practices and address structural inequalities. The evidence indicates that addressing gender inequalities requires multilevel and multisectoral approaches, integrating school, health, justice, social protection and complementary actions directed at families and communities[20]. Interventions sensitive to these dimensions are more likely to foster welcoming environments and genuine bonds. However, and as Simmel warns[1], sociability loses its free character when subjected to excessively normative strategies; thus, it is essential to preserve spontaneity of the interactions when planning actions to promote well-being.

Study Limitations

The quantitative sample was of the non-probability nature, which limits generalizability of the findings to other contexts. There is also the possibility of social desirability bias in the answers, particularly for sensitive YSR items, although this risk was mitigated through individual, self-applied data collection conducted in a private setting. In addition, the "race/skin color" variable could not be included in the analyses due to a high non-response proportion, which precluded exploring potential racial differences in sociability experiences.

Although the qualitative analysis broadened understanding of the reported experiences, some limitations must be acknowledged. Depth of the interviews was influenced by characteristics inherent to adolescence, a phase in which brief responses and difficulties in elaboration are common, which may have limited the exploration of certain subjective aspects. During the interviews, efforts were made to confirm the meaning of the answers with the adolescents themselves, a practice that contributed to greater interpretive accuracy. However, a subsequent member-checking stage was not conducted, which could have further strengthened validation of the findings. To minimize potential biases, methodological rigor strategies were adopted, including independent coding, discussions among researchers, data triangulation and collective re-evaluation of topics, which contributed to enhancing reliability of the interpretations.

These limitations point to paths for future research. Longitudinal studies may help clarify the long-term effects of socialization problems during adolescence, while specific interventions grounded on sociability principles may be developed and evaluated to promote healthier and more inclusive interactions among adolescents.

CONCLUSION

This study revealed that a significant proportion of adolescents' experience socialization problems, with 15.4% classified in the borderline and clinical categories. Girls and younger adolescents (11-14 years old) presented greater vulnerability, indicating the need for differentiated attention to these groups. The qualitative findings enabled an in-depth exploration of feelings of loneliness, social rejection, low self-esteem and interpersonal difficulties that permeate the adolescents' experiences. These aspects directly affect mental health and emotional well-being, underscoring the complexity inherent to this age group's characteristic demands.

The integration of quantitative and qualitative data highlighted the importance of understanding socialization problems from a broad perspective that encompasses both objective indicators and the adolescents' perceptions and experiences. Having applied Georg Simmel's sociability framework demonstrated how social interactions, when absent or compromised, undermine playful and reciprocal sociability experiences, negatively affecting bond formation and emotional well-being.

The results reinforce the relevance of interventions aimed at promoting socioemotional skills, conflict resolution and strengthening support networks both in school and family environments. Strategies that value the construction of more inclusive and welcoming interactions may mitigate the negative impacts of socialization problems, creating opportunities to strengthen interpersonal connections and improve the quality of the relationships.

This study advances knowledge on socialization problems in adolescence by integrating quantitative and qualitative data in a population segment that has been underexplored in Brazil, revealing emotional and social nuances that broaden understanding of sociability difficulties beyond well-established factors such as gender and age. The integrative approach made it possible to identify specific subjective dynamics that have not been sufficiently explored in prior research. Moreover, applying Georg Simmel's conception of sociability as an interpretive lens offered a relevant perspective for understanding social dynamics, showing how the absence of playful and reciprocal interactions can affect adolescents' emotional well-being.

Future studies are recommended not only to adopt longitudinal designs and specific interventions to assess the impact of strategies aimed at improving adolescents' sociability and emotional well-being, but also to incorporate an intersectional perspective, examining how race, gender, class and other social determinants interact in shaping

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socialization problems. Inclusion of this analytical lens may enhance the explanatory power of the findings and strengthen their applicability to the formulation of more equitable public policies that are sensitive to the structural inequalities affecting adolescence.

REFERENCES

1. Simmel G. A sociabilidade: exemplo de sociologia pura ou formal. In: Questões fundamentais da sociologia: indivíduo e sociedade. Rio de Janeiro: Jorge Zahar; 2006.
2. Dias FL. Sociabilidade na metrópole: as reflexões de Georg Simmel. Laboratório Didático – USP ensina Sociologia. 2012 [cited 2025 Jul 15]. Available from: https://ensinosociologia.fflch.usp.br/sites/ensinosociologia.fflch.usp.br/files/Fadil_tx_0.pdf
3. Frúgoli Jr H. Sociabilidade urbana. São Paulo: Companhia das Letras; 2007.
4. Leite RP. Margens do dissenso: espaço, poder e enobrecimento urbano. In: As cidades e seus agentes: práticas e representações. Belo Horizonte: PUC Minas/Edusp; 2006. p. 23-44.
5. Kollar LM. Promoção da saúde do adolescente e de sua família. In: Hockenberry MJ, Wilson D. Wong: fundamentos de enfermagem pediátrica. 8ª ed. Rio de Janeiro: Elsevier; 2011. p. 528-50.
6. Justo AP, Enumo SRF. Problemas emocionais e de comportamento na adolescência: o papel do estresse. Bol Acad Paul Psicol. 2015 [cited 2025 Jul 15]; 35(89):350-70. Available from: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1415-711X2015000200007&lng=pt&nrm=iso.
7. Pfeifer JH, Allen NB. Puberty initiates cascading relationships between neurodevelopmental, social, and internalizing processes across adolescence. Biol Psychiatry. 2021 [cited 2025 Jul 15]; 89(2):99-108. DOI: https://doi.org/10.1016/j.biopsych.2020.09.002.
8. Achenbach TM, Rescorla LA. Manual for the ASEBA school-age forms & profiles. Burlington (VT): University of Vermont, Research Center for Children, Youth, & Families; 2001.
9. Sharma B, Rai MK, Sharma A, Karki S. Emotional and behavioral problems among adolescents in Pokhara City in Nepal. J Nepal Health Res Counc. 2019 [cited 2025 Jul 15]; 16(41):419-24. DOI: https://doi.org/10.33314/jnhrc.1607.
10. Babicka-Wirkus A, Kozłowski P, Wirkus Ł, Stasiak K. Internalizing and externalizing disorder levels among adolescents: data from Poland. Int J Environ Res Public Health. 2023 [cited 2025 Jul 15]; 20(3):2752. DOI: https://doi.org/10.3390/ijerph20032752.
11. Philipp J, Zeiler M, Waldherr K, Truttmann S, Dür W, Karwautz AF, et al. Prevalence of emotional and behavioral problems and subthreshold psychiatric disorders in Austrian adolescents and the need for prevention. Soc Psychiatry Psychiatr Epidemiol. 2018 [cited 2025 Jul 15]; 53(12):1325-37. DOI: https://doi.org/10.1007/s00127-018-1586-y.
12. Drosopoulou G, Sergentanis TN, Mastorakos G, Vlachopapadopoulou E, Michalacos S, Tzavara C, et al. Psychosocial health of adolescents in relation to underweight, overweight/obese status: the EU NET ADB survey. Eur J Public Health. 2021 [cited 2025 Jul 15]; 31(2):379-84. DOI: https://doi.org/10.1093/eurpub/ckaa189.
13. Peterle CF, Fonseca CL, Freitas BHBM, Gaíva MAM, Diogo PMJ, Bortolini J. Emotional and behavioral problems in adolescents in the context of COVID-19: a mixed method study. Rev Latino-Am Enfermagem. 2022 [cited 2025 Jul 15]; 30(spe):e3744. DOI: https://doi.org/10.1590/1518-8345.6273.3744.
14. Creswell JW, Creswell JD. Projeto de pesquisa: métodos qualitativo, quantitativo e misto. 5ª ed. Porto Alegre: Penso; 2021.
15. Rocha MM. Evidências de validade do Inventário de Autoavaliação para Adolescentes (YSR/2001) para a população brasileira [Tese de Doutorado]. São Paulo: Universidade de São Paulo; 2012 [cited 2025 Jul 15]. Available from: https://www.teses.usp.br/teses/disponiveis/47/47133/tde-12062012-153735/pt-br.php.
16. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006 [cited 2025 Jul 15]; 3(2):77-101. DOI: https://doi.org/10.1191/1478088706qp063oa.
17. Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, et al. Improving the content validity of the mixed methods appraisal tool: a modified e-Delphi study. J Clin Epidemiol. 2019 [cited 2025 Jul 15]; 111:49-59. DOI: https://doi.org/10.1016/j.jclinepi.2019.03.008.
18. Pessalacia JDR, Menezes ES, Massuia D. A vulnerabilidade do adolescente numa perspectiva das políticas de saúde pública. Bioethikos. 2010 [cited 2025 Jul 15]; 4(4):423-30. Available from: https://saocamilo-sp.br/assets/artigo/bioethikos/80/Bioethikos_423-430_.pdf.
19. Sugimura K, Hihara S, Hatano K, Crocetti E. Adolescents' identity development predicts the transition and the adjustment to tertiary education or work. J Youth Adolesc. 2023 [cited 2025 Jul 15]; 52(11):2344-56. DOI: https://doi.org/10.1007/s10964-023-01838-y.
20. Banati P, Jones N, Moreau C, Mmari K, Kågesten A, Austrian K, et al. Intersectionality, gender norms, and young adolescents in context: a review of longitudinal multicountry research programmes to shape future action. Lancet Child Adolesc Health. 2024 [cited 2025 Jul 15]; 8(7):522–31. DOI: https://doi.org/10.1016/S2352-4642(24)00079-8.
21. Santoniccolo F, Trombetta T, Paradiso MN, Rollè L. Gender and media representations: a review of the literature on gender stereotypes, objectification and sexualization. Int J Environ Res Public Health. 2023 [cited 2025 Jul 15]; 20(10):5770. DOI: https://doi.org/10.3390/ijerph20105770.
22. Iannattone S, Miscioscia M, Raffagnato A, Gatta M. The role of alexithymia in social withdrawal during adolescence: a case-control study. Children (Basel). 2021 [cited 2025 Jul 15]; 8(2):165. DOI: https://doi.org/10.3390/children8020165.
23. Kauffman JM. Characteristics of emotional and behavioral disorders of children and youth. 6th ed. Upper Saddle River (NJ): Merrill; 2018.
24. Pacheco BGF. O papel mediador da regulação emocional na relação entre vinculação e solidão emocional e social na adolescência [Dissertação de Mestrado]. Braga: Universidade do Minho; 2023 [cited 2025 Jul 15]. Available from: https://repositorio.ispa.pt/entities/publication/c5bb84c8-57f5-43da-8fe5-266f1feebe6f.

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25. Borg ME, Willoughby T. When is solitude maladaptive for adolescents? A comprehensive study of sociability and characteristics of solitude. J Youth Adolesc. 2023 [cited 2025 Jul 15]; 52(12):2647-60. DOI: https://doi.org/10.1007/s10964-023-01856-w.

26. Kågesten A, Gibbs S, Blum RW, Moreau C, Chandra-Mouli V, et al. Understanding factors that shape gender attitudes in early adolescence globally: a mixed-methods systematic review. PLoS One. 2016 [cited 2025 Jul 15]; 11(6):e0157805. DOI: https://doi.org/10.1371/journal.pone.0157805.

27. Papageorgiou A, Fisher C, Cross D. "Why don't I look like her?": how adolescent girls view social media and its relation to body image. BMC Womens Health. 2022 [cited 2025 Jul 15]; 22:261. DOI: https://doi.org/10.1186/s12905-022-01845-4.

28. Sitnik-Warchulska K, Wajda Z, Wojciechowski B, Izydorczyk B. The risk of bullying and probability of help-seeking behaviors in school children: a Bayesian network analysis. Front Psychiatry. 2021 [cited 2025 Jul 15]; 12:640927. DOI: https://doi.org/10.3389/fpsyt.2021.640927.

29. Penner F, Gambin M, Sharp C. Childhood maltreatment and identity diffusion among inpatient adolescents: the role of reflective function. J Adolesc. 2019 [cited 2025 Jul 15]; 76:65-74. DOI: https://doi.org/10.1016/j.adolescence.2019.08.002.

30. Wicks S, Berger Z, Camic PM. It's how I am... it's what I am... it's a part of who I am: a narrative exploration of the impact of adolescent-onset chronic illness on identity formation in young people. Clin Child Psychol Psychiatry. 2019 [cited 2025 Jul 15]; 24(1):40-52. DOI: https://doi.org/10.1177/1359104518818868.

31. Branje S. Adolescent identity development in context. Curr Opin Psychol. 2022 [cited 2025 Jul 15]; 45:101286. DOI: https://doi.org/10.1016/j.copsyc.2021.11.006.

32. Voulgaridou I, Kokkinos CM. Relational aggression in adolescents: a review of theoretical and empirical research. Aggress Violent Behav. 2015 [cited 2025 Jul 15]; 23:87-97. DOI: https://doi.org/10.1016/j.avb.2015.05.006.

33. Voulgaridou I, Kokkinos CM. The mediating role of friendship jealousy and anxiety in the association between parental attachment and adolescents' relational aggression: a short-term longitudinal cross-lagged analysis. Child Abuse Negl. 2020 [cited 2025 Jul 15]; 109:104717. DOI: https://doi.org/10.1016/j.chiabu.2020.104717.

34. Collins PH. Intersectionality as critical social theory. Contemp Polit Theory. 2021 [cited 2025 Jul 15]; 20(3):690-725. DOI: https://doi.org/10.1057/s41296-021-00490-0.

35. Veenstra G, Abel T. Capital interplays and social inequalities in health. Scand J Public Health. 2019 [cited 2025 Jul 15]; 47(6):631-4. DOI: https://doi.org/10.1177/1403494818824436.

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Use of artificial intelligence tools

Authors declare the use of ChatGPT-5® to assiste text revision. The use was supervised by the authors, ensuring that interpretations and methodological decisions remained the responsibility of the research team