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RESEARCH ARTICLE

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Attachment and alexithymia predict emotional–behavioural problems of institutionalized, late-adopted and community adolescents: An explorative multi-informant mixed-method study

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Abstract

Objective: Compared to community adolescents (COM), adolescents placed in residential care (RC) or late adopted (LA) appear to show more emotional–behavioural problems. They also appear vulnerable in variables linked to emotional–behavioural problems, such as insecure–disorganized attachment and alexithymia. This study employs a mixed-method multi-informant approach to (1) compare adolescents placed in RC, LA and COM in emotional–behavioural problems, attachment and alexithymia and (2) investigate relationships and interplay of attachment and alexithymia concerning emotional–behavioural problems in these three groups.

Method: Participants were 174 adolescents (50 RC, 33 LA and 91 COM; $M_{age} = 15$, 53% boys and 47% girls). Adolescents' internalizing and externalizing problems were assessed through both caregiver-reported and self-reported questionnaires, while attachment and alexithymia were assessed with a mixed method, using interviews and self-report questionnaires.

Results: The results showed RC adolescents as more vulnerable in all variables, while LA and COM did not differ. Accounting for the group, attachment and alexithymia cumulatively predicted 25–43% of internalizing problems, and 19–43% of externalizing problems depending on the method of assessment or problems' informant (all $p < 0.01$). Alexithymia was both an independent predictor and interacted with preoccupied attachment in predicting internalizing problems, while no predictors were isolated for externalizing ones, and the group never indicate an effect on problems' rates.

Conclusions: The authors discuss the utility to maintain a research focus on attachment and alexithymia, also suggesting future directions of research. A need to determine potential distortions of results because of problems' informant and method of assessment is also highlighted.

KEYWORDS
adolescence, adoption, alexithymia, attachment, emotional and behavioural problems, institutionalized children

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1 | INTRODUCTION

Adolescents are likely to demonstrate internalizing problems—that is, symptoms of anxiety, depression, or withdrawal and somatic complaints—and externalizing problems, such as aggressive and opposite-defiant or delinquent behaviours (Achenbach & Rescorla, 2001). The former occurs more in females and older adolescents and externalizing ones in males and younger participants (Frigerio et al., 2009; Pace & Muzi, 2017; Paull, 2013).

The research also suggests certain adolescent populations as more at risk, that is, children who have suffered from relational unfavourable experiences in early relationships with primary caregivers (Jaffee, 2017; Pace et al., 2022). Specifically, children placed for adoption or in institutions are considered at-risk populations, because they may have lived similar childhood adverse experiences—for example, abandonment, neglect, and maltreatment—before being placed out of home. Such negative backgrounds could have damaged the attachment system and psychophysical development in both these groups (Juffer et al., 2011). Indeed, decades of research have compared adopted and institutionalized children to understand the outcomes of these different welfare measures on their psychosocial development (Tizard & Hodges, 1978; Vorria et al., 2006), even if research comparing adopted and institutionalized adolescents is still relatively scarce (Barroso et al., 2018).

The more critical situation concerns adolescents in institutions [i.e., in residential care (RC)] who show rates of emotional–behavioural problems ranging from 40% to 86% and are four times more at risk to show all categories of problems than their low-risk community (COM) peers (Bronsard et al., 2016; Campos et al., 2019; Castelli et al., 2016; Maggiolini et al., 2010).

Adopted adolescents appear at risk as well, especially if adopted at a later age, on average at school age, that is, late-adopted (LA) [Commission for International Adoptions (CAI), 2018]. Indeed, LA adolescents are twice more likely than non-adopted peers to show symptoms, especially externalizing problems (Barroso et al., 2018; Behle & Pinquart, 2016; Pace & Muzi, 2017; Pace et al., 2018). However, LA adolescents result less at risk than institutionalized peers, being in an intermediate position between those in institutions and the low-risk COM population (Barroso et al., 2018).

Notably, these data could be influenced by the informant of problems. Although no differences were revealed between community and adopted in cross-informant discrepancies in mental health (Roskam et al., 2017), in all groups, adolescents seem to rate higher their problems than their caregivers (Achenbach et al., 2017; Bronsard et al., 2016; Gearing et al., 2013; Handwerk et al., 2006; Roskam et al., 2017), except for some cases where adopted adolescents rated lower problems than their adoptive parents (Askeland et al., 2017).

Therefore, a multi-informant approach could help control this discrepancy.

Altogether, these worrisome data encourage the investigation of predictors and mechanisms of risk in these populations of adolescents, in line with organizational goals worldwide (UNICEF, 2015; World Health Organization, 2021).

Key Practitioner Messages

- Adolescents placed residential care due to childhood adversities appear a group at risk for emotional–behavioural problems, insecure attachment and alexithymia, that is, a deficit in emotion regulation.
- Despite their pre-adoptive adverse histories, adopted adolescents can show good adjustment, showing no difference with non-adopted peers in emotional–behavioural problems, attachment security and emotion regulation.
- Attachment insecurity and alexithymia are two aspects of emotion regulation deserving clinical attention, as related to more internalizing and externalizing problems of adolescents regardless of the group.
- It can be recommended to employ a mixed-method approach, inclusive of interviews and questionnaires, to avoid distortions in the assessment of attachment and alexithymia.
- When emotional–behavioural problems are assessed, it can be recommended to employ a multi-informant approach inclusive of both adolescents' and caregivers' points of view.

For instance, insecure attachment and alexithymia (Madigan et al., 2016; Muzi, 2020; Muzi & Pace, 2020b) and their interconnections (Schimmenti & Caretti, 2018) predict poor mental health in clinical and COM adults and adolescents (Muzi et al., 2023; Hemming et al., 2019; Honkalampi et al., 2009; Goerlich, 2018; Madigan et al., 2016; Mikulincer & Shaver, 2012; Muzi et al., 2023; Pace et al., 2020). Therefore, their investigation on adolescents in RC and LA could help in detecting different patterns of vulnerability in these populations united by a background of early relational adversities but differentiated by later rearing environments (Juffer et al., 2011).

1.1 | Attachment and emotional–behavioural problems in RC, LA and COM adolescents

Bowlby (1980) theorized that a child keeps information on how to behave and what to expect in meaningful relationships from repetitive early interactions with primary caregivers. Based on these repetitive interactions, a child develops an attachment representation that will guide an individual's expectations and behaviours within significant relationships for life (Bowlby, 1980).

Further empirical tests of this theory (Ainsworth et al., 1978; George et al., 1985; Steele & Steele, 2005) led to defining four main patterns of attachment, deemed as reflective of different underlying attachment representations:

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1. Secure–autonomous defines a pattern of balance and flexibility between closeness and autonomy within significant relationships, where the person seems able to request comfort when distressed and encouragement for exploration, value meaningful relationships and demonstrate the capacity to need, miss and help others.
2. Insecure–dismissing (i.e., avoidant) type, when the person minimizes the value of attachment relationships, downplays emotional and behavioural responses to stimuli coming from them and seems to over-privileged autonomy to the detriment of intimacy.
3. Insecure–preoccupied (i.e., anxious) defines a pattern where a person appears hyper-vigilant and over-reactive to stimuli coming from significant relationships, demonstrating excessive anger and anxiety or passivity and desire to please others (i.e., role-reversal towards parents) so that relationships appear imbalanced towards excessive intimacy to the detriment of autonomy.
4. Insecure–disorganized pattern, deemed for individuals without a coherent relational behaviour, demonstrating dismissing and preoccupied strategies simultaneously or a clear lack of a strategy because of the influence of unresolved traumas or loss experiences (Steele & Steele, 2005).

These patterns have been defined based on the coding guidelines of the gold-standard interview for adults Adult Attachment Interview (AAI; George et al., 1985), on the basis of the development of all age-adapted interviews used with adolescents, then all interviews allow capture all the four patterns through psycho-linguistic analysis of opinions and partially unaware aspects of the interviewees' speech (Muzi, 2020). However, because faster, more efficient and less time-consuming, self-report questionnaires are the method more used to assess adolescents' attachment, particularly the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). This questionnaire shows optimal psychometric proprieties (Jewell et al., 2019) and convergence with interview results in low-risk adolescents (Muzi et al., 2022) but is designed to capture the level of perceived security in attachment relationships with parents and peers, not leading to assigning a category of best-fitting attachment pattern to the respondent. Therefore, a mixed-method approach would help maximize aware and unaware information obtainable with both interviews and questionnaires, and it is particularly encouraged in at-risk populations, where questionnaires are suggested less sensitive than interviews in capturing insecurity (Madigan et al., 2016; Lionetti et al., 2015).

However, so far studies on residential care and late-adopted adolescents employed a single method. To summarize, adolescents in RC are mainly classified as insecure–dismissing or disorganized (20–76% and 12–46%, respectively; Muzi & Pace, 2021), demonstrating higher attachment insecurity than COM peers in both interview-based (Muzi et al., 2022; Zaccagnino et al., 2015) and questionnaire-based studies (Barroso et al., 2018; Shechory & Sommerfeld, 2007).

LA adolescents receive mainly secure–autonomous classifications in most interview-based studies (summarized in Table 1 of Muzi & Pace, 2021), but one study reports less secure classifications in them compared to COM peers (Peñarrubia et al., 2022), and they show more disorganization in another study (Pace et al., 2018). Questionnaire-based studies suggest no difference with COM peers in levels of attachment security (Altinoglu-dikmeer et al., 2014; Barroso et al., 2018; McSherry et al., 2016; Paull, 2013; Torres-Gomez et al., 2018), except in one case (Vantieghem et al., 2017).

Only one interview-based study reporting partial results from this sample (Muzi & Pace, 2021) and one questionnaire-based (Barroso et al., 2018) study compared adolescents in RC and LA, both reporting higher insecurity in the RC group.

A meta-analysis by Madigan et al. (2016) and some single-group studies (Muzi & Pace, 2020a; Pace et al., 2018; Paull, 2013) report attachment insecurity in the form of dismissal (i.e., dismissing pattern) or preoccupation as correlated to more internalizing problems and higher attachment disorganization was correlated to higher levels of both internalizing and externalizing ones. However, no studies investigated the predictive impact of attachment on symptoms involving together adolescents in RC, LA and COM to detect universal and group-specific mechanisms of risk.

1.2 | Alexithymia and emotional–behavioural problems in the three groups

Alexithymia is a psychological characteristic defined by difficulty in identifying and verbally describing bodily sensations and emotions, together with an external-oriented cognitive style and a general scarcity of fantasy (Bagby et al., 1994).

A conspicuous body of research detected alexithymia in adolescents, especially in girls and youngers (Muzi, 2020), establishing its predictive role on adolescents' emotional–behavioural problems, especially internalizing problems, particularly in the form of depressive symptoms (Di Trani et al., 2013; Honkalampi et al., 2009), but also with externalizing ones (Di Trani et al., 2013; Manninen et al., 2011).

According to researchers (Schimmenti & Caretti, 2018) and a recent meta-analysis (Khan & Jaffee, 2022), a history of early adverse relational experience would predispose adolescents and adults to develop more alexithymia. Therefore, adolescents in RC and LA would be deemed more alexithymic than communities, but a recent review has revealed that alexithymia investigation in these populations is scarce (Muzi, 2020). There were four studies where institutionalized adolescents were found more alexithymic than COM peers (Manninen et al., 2011; Muzi & Pace, 2020b; Paull, 2013; Powell et al., 2011), and a unique study on LA adolescents conducted on the same group of the current study, in which they appear more border-alexithymic than controls (Muzi & Pace, 2020a).

Moreover, few studies with RC or LA adolescents support higher alexithymia as predictive of more internalizing and externalizing symptoms, in line with literature on COM groups (Manninen et al., 2011; Muzi, 2020; Muzi & Pace, 2020a, 2020b). However, again there are no studies including the three groups together to differentiate mechanisms of action of alexithymia on symptoms. Moreover, all cited studies employed the questionnaire Toronto Alexithymia Scale 20 items (TAS-20; Bagby et al., 1994), which presents some issues if used with adolescents because of language or item incomprehension and a few

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TABLE 1 Sociodemographic and biographical characteristics of 174 teenagers in three groups.

Characteristic	RC adolesc.		LA adolesc.		COM adolesc.		Comparison	
	n	%	*n*	%	*n*	%	χ^2 (2)	*phi*
Gender								
Female	21	42	15	45	46	50	1.3	0.7
Male	29	58	18	55	45	50		
Place of birth								
Italy	30	60	7	21	87	96	92.6**	0.5
Foreign countries	20	40	26	79	4	15		
Parents								
Together	26	52	33	100	76	74	69.7**	0.5
Not together[a]	24	49	0	0	15	16		
Siblings								
No	13	26	12	36	23	15	9.4**	0.18
Yes	37	74	21	63	68	75		
Adverse experiences[b]								
None	0	0	0	0	90	99	337.3**	0.76
Abuse and/or neglect	38	76	15	45	0	0		
Declared parental inability	9	18	3	9	0	0		
Abandonment	2	4	11	33	0	0		
Death of parents	1	2	1	3	1	1		
Placement(s) out of family[b]								
Never	0	0	0	0	91	100	322.7**	0.73
Single	23	46	24	73	0	0		
Multiple	27	54	9	27	0	0		
	M	*SD*	*M*	*SD*	*M*	*SD*	*F (2,171)*	η^2
Age (years)	15.6	2	14.8	2.3	15.8	2.2	2.7	12.9
Education (years)	8.4	2.7	8.8	2.5	10.6	2.3	16.8**	90.5
Verbal skills	88.6	16.9	98.9	12.6	99.5	18.9	2.9	2.9

Note: $N = 174$ (of whom 50 were in residential care, 22 late-adopted, and 91 were from the community).
[a]Divorced, separated, or widowed.
[b]No comparison due to cell values of <5.
[c]Corresponds to the reason for placement out of family.
[d]Measured through the Verbal Comprehension Index of the Wechsler Intelligence Scale for Children—Fourth Edition (Wechsler, 2003).
*$p < 0.05$,
**$p < 0.01$.

psychometric weaknesses, running the risk to overestimate levels of alexithymia (Parker et al., 2010). Therefore, a mixed-method approach might be a way to check this distortion, and Montebarocci and Surcinelli (2018) suggest employing the interview developed to overcome TAS-20 limits, the Toronto Structured Interview for Alexithymia (TSIA; Bagby et al., 2006) to reach more effective alexithymia assessment.

1.3 | Cumulative effects of attachment and alexithymia

Attachment insecurity and alexithymia can have a common origin in unfavourable experiences with primary caregivers affecting the development of a child's emotion regulation (Schimmenti & Caretti, 2018). Therefore, they are suggested to interact in influencing individual development, and there is a growing interest in investigating their interplay on psychopathology development (Thompson et al., ongoing meta-analysis).

A review (Schimmenti & Caretti, 2018) and a study on youths in institutions and foster care (Paull, 2013) report that insecure–dismissing individuals show higher scores in the alexithymia dimension of difficulty in identifying feelings, while insecure–preoccupied ones show higher difficulty in verbally describing feelings. Conversely, higher alexithymia would be implied in the mechanisms of maintenance of an insecure attachment pattern in adulthood, and the two constructs interplay in determining adults' symptoms onset and maintenance (Schimmenti & Caretti, 2018).

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Less information on adolescents is available, suggesting a cumulative effect on symptoms' prediction. Few studies supported that insecure–dismissing and insecure–preoccupied attachments predict higher alexithymia (*e.g.*, Boisjoli et al., 2019), and high levels of alexithymia can increase the risky effect of the insecure attachment on psychopathological symptoms of COM (Cerutti et al., 2018; Deborde et al. 2012) and RC youths (Boisjoli et al., 2019; Paull, 2013).

1.4 | The current study

From the above, literature gaps emerged in terms of comparative studies on alexithymia including RC, LA and COM adolescents together. For instance, no studies investigated how attachment and alexithymia could differently relate to emotional–behavioural problems according to the group, and no studies employed a multi-informant mixed-method approach controlling for gender and age, which might maximize the information obtainable by helping to verify data distortions.

To help fill these gaps in the literature, this explorative study for the first time included three groups of RC, LA and COM adolescents, aiming to answer two research questions (RQs):

(1) Are there group differences in internalizing and externalizing problems, attachment and alexithymia?

Adolescents in RC were hypothesized to show more internalizing and externalizing problems, attachment insecurity of all types and alexithymia than both LA and COM. Adolescents in LA were hypothesized to show more externalizing problems, attachment disorganization and more alexithymia than COM peers.

(2a) Do attachment insecurity and alexithymia show independent, cumulative or interactive predictive effects on more internalizing and externalizing problems of adolescents, accounting for their group?

(2b) Are there differences in results according to the method of assessment or problems' informant?

Concerning RQ2, given the lack of or controversial results in the existing literature, the formulation of hypotheses appears premature and the nature of this study is exploratory to contribute to providing data potentially useful for further research.

2 | METHOD

2.1 | Participants and procedure

The research got prior ethical approvals from the University's Department Ethical Committee (protocol n. 012) and the local Social Services for Minors (approval n. PG/2017/368220). Potential participants were recruited with the collaboration of Health and Social Services for the RC group, through public adoption services and authorized services for international adoptions *[Blinded]* and *[Blinded]* for the LA group, and through public schools for the COM group.

Adolescents were included if they (1) had [*Language*] proficiency to respond to interviews and questionnaires, (2) did not have diagnoses for severe physical or cognitive disabilities or psychotic or dissociative disorders and (3) were between 10 and 19 years of age. One-hundred-ninety-three adolescents were contacted between 2017 and 2019, of which 19 did not take part for their or their legal caretakers will. The remained adolescents (90% of those eligible) agreed to participate by signing an informed consent, which was also signed by legal caretakers of minors. The participation was voluntary; the adolescents did not receive any incentive.

Participants were assessed between 2018 and 2020, during two home-visiting individual sessions lasting around 1 h and a half, one session for each 45-min interview to avoid adolescents' fatigue. At the end of the first session, adolescents also filled out questionnaires, and meanwhile, the biological or adoptive mother and the main educator in the RC group fulfilled the questionnaires about socio-demographic information and their rates of emotional–behavioural problems. The entire data collection in the RC and LA groups was performed by the first author, who collected half of the data in the COM group and trained and supervised MSc students in psychology in collecting the remaining data. All interviews were recorded and transcribed verbatim, anonymizing participants' details, and all measures were covered by alphanumeric identification codes.

The entire final group includes 174 adolescents aged 10–19 years (mean [*M*] = 15.55, standard deviation [*SD*] = 2.02, 53% boys). The two at-risk groups counted 50 participants in RC (age at placement $M = 13.6$, $SD = 3$, length of placement $M = 3.2$, $SD = 2.6$) and 33 late-adopted adolescents (age at adoption $M = 5$, $SD = 3.2$, length of placement $M = 9.5$, $SD = 3.7$). The low-risk group counted 91 COM adolescents grown with their biological families of origin, with no differences in age and gender distribution with the other two groups. Full details of participants in the three groups are reported in Table 1, including their family characteristics and rates of childhood adversities. As shown in Table 1, RC and LA adolescents experienced more childhood adversities than COM ones. LA adolescents mainly came from foreign countries, but they were educated in (Country) since primary school, and groups did not differ in education level or verbal skills.

2.2 | Measures

2.2.1 | *Socio-demographic information* sheet ad hoc (Pace et al., 2019)

This sheet collected information about participants' education, family and pre-placement variables in RC and LA groups (*e.g.*, age, length, reasons for placement and multiple placements).

2.2.2 | Emotional–behavioural problems

Two specular questionnaires from the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001; Frigerio et al., 2009) were used to assess participants' symptoms, as

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rated by the main caregiver through the Child Behaviour Check List 6–18 years (CBCL) or self-rated by the adolescent through the Youth Self Report 11–18 years (YSR). Both questionnaires rate the frequency of problems through 112 items on a three-point Likert scale (0 = never true, 1 = sometimes true and 2 = often or always true), providing three main scores of internalizing problems (summed scores of depression/withdrawal, anxiety and somatic complaints syndrome scales), externalizing problems (summed scores of aggressive behaviours and opposite/defiant behaviours in the CBCL or delinquent behaviours in the YSR) and total problems as the sum of the cited syndrome scales plus others (attentional, thought or social problems). The unique difference is the existence in the YSR of an additional adolescent-specific scale for identity-related problems. ASEBA questionnaires show robust psychometric values worldwide (Achenbach et al., 2016), with Cronbach's alphas in the version here used being 0.64 or more for both CBCL and YSR. In this study, Cronbach's alphas of CBCL were 0.79 for internalizing problems and 0.82 for externalizing problems, while the same values of the YSR were 0.86, 0.84 and 0.70.

2.2.3 | Attachment

Attachment representations were measured through the semi-structured interview Friends and Family Interview (FFI; Steele & Steele, 2005; Pace et al., 2020), and the most used self-report questionnaire during adolescence, the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987; Pace et al., 2011).

The Friends and Family Interview version used in this study contains 27 questions and lasts approximately 45 min. The adolescent is asked about his/her relationships with parents, friends, siblings, and, optionally, other potentially significant attachment figures. Interviews are audio or videotaped and transcribed verbatim, covering participants' details. Then, certified raters assign scores ranging from 0 (no evidence) to 4 (marked evidence) in eight dimensions with several sub-dimensions (see Pace et al., 2020 for a detailed description), of which combination led to assigning scores in four scales corresponding to four attachment patterns as described in the introduction: secure–autonomous, insecure–dismissing, insecure–preoccupied and insecure–disorganized. Of these scores, the higher corresponds to the best-fitting attachment category. The FFI shows good psychometric proprieties and convergent validity with the IPPA in low-risk adolescents (Muzi et al., 2022; Pace et al., 2019), with Cronbach's alphas ranging from 0.83 to 0.84 (Psouni et al., 2020; Stievenart et al., 2012). Of the FFIs, 56 (32%) were rated by two independent certified reliable raters (the authors) who reached 95% agreement on secure–insecure classifications ($k = .89$), 96% on four-way ones ($k = .94$) and 100% on organized–disorganized categories. Scores of the two raters highly correlated with each other (all $p < 0.001$), and their means were used as the final scores of this study. The remaining 117 FFIs (67%) were rated by the first author. Cronbach's alphas range from 0.83 to 0.84 in the literature (Psouni et al., 2020; Stievenart et al., 2012), being 0.88 in the current study.

The Inventory for Parent and Peer Attachment contains 75 statements, grouped into 25 specular items referring to the relationship with the mother, the father and peers, respectively. Scores 1 to 5 are computed in three scores of Trust, Communication and Alienation, of which the average is the score of total Attachment Security towards each figure, of which this study considered the two towards mother and father. The version here used showed Cronbach's alphas of 0.93 and 0.94 for the mother and father respectively, being 0.87 for the mother and 0.93 for the father in this study.

2.2.4 | Alexithymia

Alexithymia was measured through the semi-structured interview Toronto Structured Interview for Alexithymia (TSIA; Bagby et al., 2006; Caretti et al., 2011) and the questionnaire on which the interview is based, the widely known Toronto Alexithymia Scale 20-items (TAS-20; Bagby et al., 1994; Bressi et al., 1996).

The version of the Toronto Structured Interview for Alexithymia here used contains 24 questions, six for each of the four factors Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF), Externally Oriented Thinking (EOT), and Lack of Imaginative Processes (IP). For each question, the interviewer can ask examples and delve into the interviewee's answer until the trained interviewer feels confident in assigning a score to the answer to that question, ranging from 0 (no evidence) to 2 (marked evidence). The TSIA provides scores in the four factors, plus a total score of alexithymia ranging from 0 to 48 points, the unique considered in this study. The version here used showed Cronbach's alpha of 0.86 in adults (Caretti et al., 2011). In the current study, the TSIA were all group-coded by the first author (certified coder) together with groups of trained MSc students, and an expert of the TSIA ([Name]) blinded supervised the score assignment, while the Cronbach's alpha was 0.78.

The Toronto Alexithymia Scale 20-items asked the respondent to agree with 20 sentences on a Likert scale from 1 ('completely not agree') to 5 ('completely agree'), providing scores in three factors DIF, DDF, and EOT, plus the total score of alexithymia 0–100 considered in this study. The version here used showed Cronbach's alphas of 0.75 and 0.82 in community and clinical groups, respectively, being 0.75 in this study.

2.3 | Analytic plan

Analyses were performed through IBM SPSS software, v.23.

Because the groups had different sizes, Levene's test was used to preliminary check the variance of scores, detecting outliers according to Hoaglin and Iglewicz (1987) criteria, which were 'winsorized' (Dixon, 1980). Given the limited group size of the groups, all analyses were considered statistically significant with $p < 0.01$ and 99% confidence intervals (CIs), providing effect sizes (ESs) (Wasserstein & Lazar, 2016), that is, Cohen's d for two-group comparisons (small effect with $d = 0.2$, medium with $d = 0.5$ or more and large with $d = 0.8$ or more;

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Cohen, 1988) and partial eta squared for one-way analysis of variance (ANOVA) and general linear models (GLMs). Missing data have been treated through listwise deletion.

Gender and age differences in scores for all variables were preliminarily checked in the whole group through a *t*-test for independent groups and Pearson's correlations, respectively.

Pearson's correlations were used to check relations between study variables, partialized for gender or age if appropriate. To answer the RQ1, ANOVA with Bonferroni post hoc correction was performed. To answer the RQ2, different GLMs were performed on internalizing and externalizing problem scores on CBCL (parent-rated) and YSR (adolescent-rated). Predictors in interview-based models were scores of the attachment patterns in the FFI and total alexithymia in the TSIA. Predictors in questionnaire-based models were scores of attachment security to mother and father in the IPPA and of total alexithymia in the TAS-20. Additional mixed-method GLMs were performed, including the FFI and the TAS-20 scores as predictors. Mixed models TSIA–IPPA were not performed because the TSIA has been never used with adolescents, so the reliability of the alexithymia results with this method is not empirically supported in adolescent populations. Group (RC = 2, LA = 1, COM = 0) was inserted as a covariate according to the results of preliminary analyses.

3 | RESULTS

Preliminary analyses reveal higher internalizing problems in girls in both CBCL and YSR, as well as boys as more insecure–dismissing in the FFI, so correlations with these three scales were partialized for gender. Age did not show correlations with any variable. Supplementary Table 1 reports the correlation matrix between study variables in the entire group.

3.1 | Answer to RQ1: Group differences

Table 2 shows group differences in almost all study variables. The Bonferroni post hoc tests revealed more unfavourable outcomes for RC adolescents compared to the other two groups in almost all variables, while LA adolescents did not show differences with COM peers. The only variable where groups did not show significant differences was the FFI attachment preoccupation (all $p > 0.240$).

Effect sizes of the two-group comparisons reported in Supplementary Table 2 reveal that differences between RC and LA adolescents were strong or moderate in almost all variables, except for the FFI dismissing pattern (small, $d = 0.47$) and preoccupied one (small,

TABLE 2 Means (*M*), standard deviations (*SD*) and one-way analyses of variance with Bonferroni post hoc correction for the effect of the group on internalizing and externalizing problems, attachment, and alexithymia in 174 teenagers.

	RC adolescents		LA adolescents		COM adolescents		*F*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	(2,169)	
CBCL[a]								
Internalizing problems	19.40_a	12.32	10.03	7.10	9.42	6.42	22.36**	0.212
Externalizing problems	22.48_a	11.15	7.81	8.29	6.96	6.06	59.74**	0.419
YSR[b]								
Internalizing problems	26.89_a	11.70	14.75	10.63	17.18	9.62	17.13**	0.172
Externalizing problems	20.59_a	8.54	12.06	8.29	12.24	6.20	21.97**	0.210
FFI[c]								
Secure–autonomous	1.70_a	0.74	2.69	0.72	2.91_a	0.95	31.36**	0.273
Insecure–dismissing	2.36_a	0.87	1.94	0.81	1.52	0.75	17.46**	0.173
Insecure–preoccupied	1.76	0.83	1.48	0.58	1.52	0.67	2.19	0.026
Insecure–disorganized	1.79_a	0.83	1.37	0.63	1.21	0.47	13.51**	0.139
IPPA[b,d]								
Attachment mother	76.24	21.74	87.31	16.09	90.52_a	16.76	9.16**	0.102
Attachment father	72.35	26.76	88.10_a	18.26	83.83	19.44	5.34*	0.067
TSIA[c] total alexithymia	22.97_a	7.52	7.91	4.37	8.78	4.21	97.24**	0.148
TAS-20[b,d] total alexithymia	61.04_a	10.94	53.53	8.93	51.62	9.50	14.21**	0.571

Note: Groups: Community = 0, Late-adopted = 1, residential care = 2. Means with subscript 'a' differ at the $p = 0.01$ level by Bonferroni post hoc test, with $mean_a$ as the highest.

Abbreviations: η^2 = partial eta squared; FFI, Friends and Family Interview; IPPA, Inventory of Parent and Peer Attachment; TAS-20, Toronto Alexithymia Scale 20 items; TSIA, Toronto Structured Interview for Alexithymia.

[a]Parent-reported in the Child Behaviour Check List 6–18 years (CBCL).

[b]Self-reported by the teenager in the Youth Self Report 11/18 Years (YSR).

[c]Interview.

[d]Questionnaire.

*$p < 0.01$,

**$p < 0.001$.

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$d = 0.39$). As well, differences between RC and COM adolescents were of strong magnitude in all variables except IPPA attachment to father (small, $d = 0.49$) and the FFI preoccupied pattern, almost null ($d = 0.06$). Instead, the entities of differences between LA and COM adolescents were all almost null or small, except for the insecure–dismissing pattern where the difference was moderate ($d = 0.59$).

3.2 | Answer to RQ2: Mixed-method multi-informant models of prediction

Independent, cumulative, and interactive effects of attachment and alexithymia are reported in Table 3 (internalizing problems) and Table 4 (externalizing problems).

TABLE 3 Mixed-method models of prediction of internalizing problems as parent-reported and self-reported by 174 teenagers, reporting the main effects and interaction(s)[a] of group[b], attachment, and alexithymia.

		99% CI for B					
	B	*LL*	*UL*	*SE B*	R^2	$\triangle R^2$	η^2
Outcome: CBCL score							
Interview-based model					0.35	0.27	0.35*
Group[b]	−22.76	−67.25	21.72	17.01			
FFI secure–autonomous	−9.97	−23.34	3.41	5.11			
Insecure–preoccupied	7.05	−5.20	19.30	4.68			
Insecure–disorganized	−2.55	−17.86	12.76	5.85			
TSIA alexithymia total	−0.70	−2.84	1.43	0.82			
Mixed-method model					0.36	0.28	0.36**
Group[b]	−3.86	−40.95	33.23	14.20			
FFI secure–autonomous	2.40	−15.12	19.92	6.71			
Insecure–preoccupied	−5.70	−25.47	14.08	7.57			
Insecure–disorganized	4.60	−0.51	9.72	1.96			
TAS-20 alexithymia total	0.05	−0.77	0.88	0.31			
Outcome: YSR score							
Interview-based model					0.34	0.25	0.34**
Group[a]	−0.35	−63.07	63	24.09			
FFI secure–autonomous	4.72	−13.30	22.74	6.89			
Insecure–preoccupied	3.97	−11.97	19.92	6.10			
Insecure–disorganized	3.58	−16.77	23.93	7.78			
TSIA alexithymia total	0.74	−2.03	3.50	1.06			
Questionnaire-based model					0.47	0.43	0.47**
Group[a]	−8.44	−65.44	28.62	13.07			
IPPA attachment security Father	0.10	−0.44	0.64	0.21			
TAS-20 alexithymia total	0.83*	0.16	1.51	0.26			
Mixed-method model					0.48	0.43	0.48**
Group[a]	−17.10	−55.55	21.33	14.73			
FFI secure–autonomous	4.23	13.38	21.83	6.74			
Insecure–preoccupied	−19.40	−40.52	1.72	8.09			
Insecure–disorganized	3.03	−2.46	8.52	2.10			
TAS-20 alexithymia total	−0.13	−1	0.74	0.33			
Interactions[a] Ins-preoccupied*alexithymia	0.40*	0.07	0.72	0.13			

Abbreviations: η^2, partial eta squared; CBCL, Child Behaviour Check List 6–18 years; CI, confidence interval; FFI, Friends and Family Interview; IPPA, Inventory of Parent and Peer Attachment; LL, lower limit; SE, standard error; TAS-20, Toronto Alexithymia Scale 20 items; TSIA, Toronto Structured Interview for Alexithymia; UL, upper limit; YSR, Youth Self Report 11–18 years.

[a]Only statistically significant interactions are reported.

[b]Community (COM) = 0. Late-adopted (LA) = 1. In residential care (RC) = 2.

*$p < 0.01$,

**$p < 0.001$.

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TABLE 4 Mixed-method models of prediction of externalizing problems as parent-reported (CBCL) and self-reported (YSR) by 174 teenagers, reporting the main effects and interaction(s)[a] of group[b], attachment, and alexithymia.

		99% CI for B					
	B	LL	UL	SE B	R^2	$\triangle R^2$	η^2
Outcome: CBCL score							
Interview-based model					0.45	0.40	0.45**
Group[b]	−26.09	−63.55	11.36	14.33			
FFI secure–autonomous	−12.35	−25.26	0.56	4.94			
Insecure–disorganized	−3.97	−19.45	11.52	5.92			
TSIA alexithymia total	−0.99	−2.72	0.75	0.66			
Questionnaire-based model					0.46	0.43	0.46**
Group[b]	−3.88	−37.68	29.91	12.95			
IPPA attachment security Mother	0.20	−0.41	0.81	0.23			
TAS-20 alexithymia total	0.50	−0.29	1.30	0.30			
Mixed-method model					0.47	0.42	0.47**
Group[b]	−5.39	−41.35	30.58	13.78			
FFI secure–autonomous	−9.92	−27.45	7.61	6.72			
Insecure–disorganized	1.20	−3.85	6.26	1.94			
TAS-20 alexithymia total	0.13	−0.43	0.68	0.21			
Outcome: YSR score							
Interview-based model					0.26	0.19	0.26**
Group[a]	15.58	−20.16	51.32	13.67			
FFI secure–autonomous	2.58	−9.25	14.42	4.53			
Insecure–disorganized	11.37	−2.80	25.54	5.42			
TSIA alexithymia total	1.08	−0.49	2.65	0.60			
Questionnaire-based model					0.27	0.23	0.27**
Group[a]	−4.03	−32.68	24.62	10.98			
IPPA attachment security Mother	0.13	−0.40	0.66	0.20			
TAS-20 alexithymia total	0.34	−0.35	1.02	0.26			
Mixed-method model					0.30	0.24	0.30**
Group[a]	−1.87	−32.80	29.06	11.85			
FFI secure–autonomous	5.06	−9.56	19.68	5.60			
Insecure–disorganized	1.66	−2.81	6.13	1.71			
TAS-20 alexithymia total	0.33	−0.14	0.82	0.18			

Abbreviations: η^2 = partial eta squared; CBCL = Child Behaviour Check List 6–18 years (parent- or educator-rated symptoms); CI, confidence interval; FFI = Friends and Family Interview; IPPA = Inventory of Parent and Peer Attachment; LL, lower limit; SE, standard error; TSIA = Toronto Structured Interview for Alexithymia; UL, upper limit; YSR = Youth Self Report 11–18 years (teenager self-rated symptoms).
[a]No statistically significant interactive effects have been found, so they have been not reported.
[b]Community (COM) = 0. Late adopted (LA) = 1. Residential care (RC) = 2.
*$p < 0.01$,
**$p < 0.001$.

Based on the correlation matrix in Supplementary Table 1 and group differences, the group was always inserted as a predictor and its interaction with attachment and alexithymia has always been checked. The interactive effect of attachment and alexithymia was calculated in all models according to the correlations.

3.2.1 | Predictors of internalizing problems

Table 3 details all GLMs for internalizing problems, which were all significant except for the questionnaire-based GLM cannot be performed because there was no correlation between CBCL/internalizing and IPPA scales. Overall, the GLMs suggested cumulative effects of

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group, attachment and alexithymia on these problems, plus some independent or interactive effects.

Parent-rated problems on CBCL

The interview-based GLM was significant and predicted 27% of the variance, $F(17) = 4.10$, $p = 0.002$, not revealing independent or interactive predictors. The mixed-method GLM predicted 28% of the variance, $F(16) = 4.87$, $p < 0.001$, with no independent or interactive predictors detected.

Adolescents' self-reported problems in the YSR

The interview-based GLM predicted 25% of the variance, $F(17) = 3.83$, with no independent or interactive predictors. The questionnaire-based GLM predicted 43% variance, $F(9) = 13.76$, $p < 0.001$, highlighting the higher TAS-20 alexithymia as a unique independent predictor. The mixed-method GLM predicted 43% variance, $F(16) = 8.56$, $p < 0.001$, revealing as a unique significant predictor for more problems the interactive effect between higher FFI preoccupation and higher TAS-20 alexithymia.

3.2.2 | Predictors of externalizing problems

As detailed in Table 4, all GLMs for the prediction of externalizing problems scores were statistically significant, all with $p < 0.001$, supporting a cumulative effect of group, attachment and alexithymia on this category of problems.

Caregiver-rated problems on CBCL

The interview-based model was predictive at 40%, $F(13) = 8.34$. The questionnaire-based GLM predicted a 43% variance, $F(9) = 14.08$. The mixed-method model predicted 42% of the variance, $F(12) = 10.62$, $p < 0.001$. No independent or interactive predictors were revealed in any model.

Adolescents' self-reported problems in the YSR

The interview-based model predicted 19% of the variance, $F(13) = 3.53$. The questionnaire-based model predicted 23% variance, $F(9) = 6.50$, and the mixed-method one 24%, $F(12) = 5.28$. No independent or interactive predictors were revealed in any model.

4 | DISCUSSION

This explorative study involved two groups of at-risk adolescents, that is, in residential care and late-adopted, and a low-risk group of community adolescents as a control group, aiming to explore several open questions and doubts raised by discrepancies and gaps in the literature on mechanisms related to psychopathology in these populations.

4.1 | RQ1: Group differences

Adolescents in RC were hypothesized to show more emotional–behavioural problems, attachment insecurity of all types and alexithymia, and adolescents in LA were hypothesized to show more externalizing problems, attachment disorganization and more alexithymia than COM peers.

The first research question was about group differences in emotional–behavioural problems and two potential predictors related to emotion regulation, that is, attachment and alexithymia. Asking this question was necessary to support the assumption of different vulnerability across groups, based on findings from single groups in the absence of comparative studies that included all three groups of adolescents.

About RQ1, results substantially confirmed hypotheses on RC adolescents based on previous literature (Bronsard et al., 2016; Castelli et al., 2016; Juffer et al., 2011; Manninen et al., 2011; Muzi & Pace, 2020a, 2020b, 2021; Paull, 2013; Zaccagnino et al., 2015). Indeed, as expected, findings highlight that RC adolescents, compared to both LA and COM peers, show higher internalizing and externalizing problems both caregiver (CBCL)- and self (YSR)-reported; lower attachment security—measured both through interview-based (FFI) and questionnaire-based (IPPA) method—as well as higher insecure–dismissing (only compared to COM peers) and insecure–disorganized pattern measured by interview; and higher alexithymia, assessed through both interview-based (TSIA) and questionnaire-based (TAS-20) method.

On the contrary, none results on the LA group support the hypothesized greater vulnerability of the late-adopted group to externalizing problems both caregiver (CBCL)- and self (YSR)-reported; attachment disorganization assessed by the FFI, and alexithymia measured both through interview and questionnaire-based method, contrasting part of the literature (Campos et al., 2019; Muzi & Pace, 2020a; Pace et al., 2018) and overall suggesting that LA adolescents of this study cannot be considered an at-risk group. Certain results also suggest dimensions of possible resilience in this group that should be further investigated, such as the higher scores of self-reported attachment security to father in the IPPA (where RC and COM groups did not differ in this variable), potentially supporting the literature that recognize adoptive fathers as more involved in their adolescents' life (Rosnati et al., 2013).

Further, a noteworthy result regards the absence of group differences in attachment insecure–preoccupied pattern and between RC and LA adolescents in the insecure–dismissing one. The first result could be explained by the ambivalent feelings, sometimes only partially aware, elicited by the reworking of relationships with parental figures that takes place during adolescence, where conflicting feelings of anger can emerge alternating with desires for closeness and to please them can strong emerge in all adolescents regardless of their background (Otterpohl et al., 2021). Concerning the second result, albeit statistical significance was not reached, LA adolescents showed

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higher dismissal than COM peers of a moderate entity, while the difference with RC peers was small. This can suggest that, despite not being marked as in childhood, traces of attachment dismissal in intimate relationships remain in the LA group as in the RC one, suggesting a long-lasting effect of early relational adversities (Schneider, 2013).

4.2 | RQ2a: Mixed-method multi-informant prediction of symptoms

Models of prediction in response to RQ2 suggest that all adolescents who present cumulatively insecurity in attachment and higher alexithymia tend to show higher scores of internalizing and externalizing problems, potentially supporting research findings of scarce studies on community adolescents (Cerutti et al., 2018) or other at-risk groups (Boisjoli et al., 2019).

Concerning *internalizing problems*, once controlled for the effect of gender differences, attachment, and alexithymia potentially accounted for 25–43% more internalizing symptoms of anxiety, depression, withdrawal, or somatic complaints in adolescents. From the results, adolescents who showed higher alexithymia—that is, poor affective awareness—showed higher levels of internalization, especially when their attachment representations were characterized by preoccupation, in terms of partially unaware excessive anger or age-inappropriate desire to please parents. On the one hand, these results suggest that both attachment preoccupation and alexithymia may increase the tendency to show internalizing problems in all adolescents, in line with the literature (Ling et al., 2016; Madigan et al., 2016; Manninen et al., 2011). On the other hand, the interaction of the two variables revealed by one of the models should be further investigated, as so far never been tested in these populations.

Regarding models of prediction for *externalizing problems*, they explained 23–43% of the variance. Results only suggest a potential cumulative effect of attachment and alexithymia, as no independent or interactive effects have been revealed on more aggressive or rule-breaking/delinquent behaviours of adolescents. In other words, regardless of the group, the different factors—that is, higher attachment insecurity and higher alexithymia—seemed to cumulatively predict higher externalizing problems, but none of them predicted the problems alone or in interaction.

Of note, contrary to meta-analytically based expectations (Madigan et al., 2016), secure, dismissing and disorganized patterns never showed an effect of prediction on adolescents' emotional–behavioural problems but only associations. Given there was no group difference in predictors, these (absent) results can be due to the heterogeneity of the entire group or limited group size, limiting the statistical power. Indeed, some correlations approached but not reached statistical significance (*i.e.*, higher attachment preoccupation along with higher externalizing problems, in line with Lacasa et al., 2015). For precaution, they were not explored as predictors in these small groups, but they can be the focus of future studies with larger samples. Alternatively, results may support less conspicuous findings claiming that not necessarily attachment dismissal (Rosenstein & Horowitz, 1996) and disorganization (Zegers et al., 2008) led to more internalizing and externalizing problems. Regarding dismissal, some authors (Mikulincer & Shaver, 2012; Rosenstein & Horowitz, 1996) highlight dismissal as more related to substance use disorders and narcissistic traits in adolescents, of which symptoms not captured by the YSR and CBCL internalizing and externalizing problems scales considered in this study. Concerning disorganization, a recent systematic review (Tironi et al., 2021) highlights that, in general, insecure attachment and particularly disorganization are more related to psychophysiological vulnerabilities predisposing to psychopathologies—such as emotional dysregulation and overreactive response to stressors—than being related directly to a certain type of symptoms. In this regard, one can also hypothesize more complex pathways of relationships among these constructs, which may be part of a broad framework where adolescents' symptomatology and difficulties in the area of emotional regulation co-occur as sides of the same vulnerability coin (Aldao et al., 2016). The analysis of other possible related variables can foster a deeper comprehension, for instance, adolescents' emotional–behavioural problems and emotion regulation can both be influenced by exposure to childhood adversities (Miu et al., 2022), adolescents' executive functioning (Berthelsen et al., 2017) or current caregivers' features such as attachment states of mind, parental stress or reflective functioning (Decarli et al., 2022; Ozturk et al., 2019; Pace et al., 2019).

4.3 | RQ2b: Differences in results due to informant and method of assessment

As the last point, this study employed a mixed-method multi-informant approach to note potential differences in the results due to informant of the symptoms, that is, parent or adolescent, or method of assessment of the variables, following literature suggestions (Achenbach et al., 2017; Madigan et al., 2016; Muzi et al., 2022).

Once controlled the effect of gender (girls showing more internalizing problems, the only result in line with the literature; Frigerio et al., 2009; Muzi, 2020; Pace et al., 2019)—the mixed-method multi-informant approach allowed highlighting different results based on the informant or method of assessment. Indeed, the score variability accounted by attachment and alexithymia varied if CBCL or YSR was used, and the higher predictive power on internalizing problems was always reached when the informant was an adolescent, while all models on externalizing problems predicted a higher percentage of variance when the informant was the caregiver. Given existing literature exclusively focuses on parent-teenager disagreements (Achenbach et al., 2017), there is no literature on how the informant is related to the registered levels of adolescents' symptoms, helpful to comment on this result. Future psychometric studies can explore if the informant of problems can be a source of distortion of results of prediction models, and eventual differences in the populations here

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considered where parent–adolescent discrepancies may vary (Achenbach et al., 2017; Askeland et al., 2017; Bronsard et al., 2016; Gearing et al., 2013). Concerning the method of assessment, the interview-based model always predicted slightly lower percentages of the variance than the questionnaire-based and mixed-method one, with the latter, usually predicting a higher percentage. Perhaps, the lower prediction with the interview-based model can be due to the TSIA, which is an interview for adults so far tested as potentially suitable for COM adolescents (Muzi et al., 2023) but never tested in at-risk samples. However, statistical comparisons between models are needed to test if one of them can be more predictive than the others, not only in adolescent groups but also employing attachment measures with younger children (*e.g.*, Marci et al., 2021).

Two results stand out. First, a greater prediction of alexithymia on internalizing problems when rated with the TAS-20, and alexithymia was always the unique significant predictor of internalizing problems in all questionnaire-based models. This may suggest that the predictive power of alexithymia on problems could be strengthened when the questionnaire is used instead of the TSIA interview, as noted before by Pace et al. (2019). Future psychometric studies can clarify the statistical significance and nature of these results, examining if related to weaknesses of the most recent TSIA or to an overestimation of relationships between alexithymia and symptoms employing the TAS-20 with adolescents, as suggested by Pace et al. (2019). Second, attachment was a unique significant predictor or interacted with alexithymia only when the interview FFI was used. This may support the greater sensitivity of interviews than questionnaires in detecting attachment insecurity and its connection to adolescents' psychopathology, especially in more insecurely attached populations (Madigan et al., 2016; Muzi et al., 2022).

These findings and existing literature still do not allow establishing with certainty which models are more reliable, but the mixed-method and interview-based models seem best able to capture the role of both predictors and their interactions in determining adolescents' symptoms.

4.4 | Clinical relevance of the findings

In conclusion, this study may have several implications to be subjected to greater empirical and clinical verification.

First, the connection of alexithymia with adolescents' internalizing problems would suggest the utility to foster affective awareness and emotional labelling development in all adolescents.

Second, the results may suggest considering late-adopted adolescents similar to non-adopted peers, being mostly low-risk like the COM sample, supporting adoption as an effective measure to foster the catch-up of children exposed to early adversities (Juffer et al., 2011). However, results can be due to the small heterogeneous group, as some differences approached statistical significance, for example, LA adolescents showed higher attachment dismissal than COM peers with no difference with the residential care group in this type of insecurity. Therefore, researchers and professionals are invited to not stop to the absence of statistical difference with non-adopted peers, maintaining clinical attention and long-term attachment-informed post-adoptive monitoring in this group (Pace et al., 2018; Palacios et al., 2019; Santona et al., 2022, 2022), which may be still vulnerable as supposed not-originally secure but developed-secure in attachment after a positive adoption (Pace et al., 2019; Peñarrubia et al., 2022).

Concerning the group in RC, accounting for the study's psychometric weak due to limited group sizes and poor generalizability, the absence of interaction between the group and the predictor may indicate that the higher insecurity and alexithymia of the adolescents in RC do not increase their likelihood of showing psychopathological problems more than in all other adolescents. In other words, attachment and alexithymia show similar connections to psychopathology in all these adolescent participants regardless of their group, and probably, adolescents in RC show more unfavourable outcomes due to the cumulative effects of other disadvantages they are exposed, for example, environmental and relational instability, and current adverse experiences inside the institutions (Attar-Schwartz, 2017; Warner et al., 2017), or self-perception as "diverse" from the not-institutionalized counterpart (Calheiros et al., 2021). This call researchers for more investigate these variables' impact on the mental health of institutionalized adolescents, as well as focus more on those variables and processes related to their resilience (van Ijzendoorn et al., 2011), for example, positive relationships with the professional caregivers or peers (Costa et al., 2020).

Last, an outstanding implication of these results is the potential enrichment of using a mixed-method multi-informant approach, especially employing an interview to assess attachment. Albeit more tiring and complex to interpret, this approach can widen the view on adolescents' difficulties and potentially foster alliances with all the actors implied and between them, for example, by communicating caregiver–adolescent discrepancies in rating problems.

4.5 | Limitations

Despite the strengths of these findings and their potential clinical relevance discussed above, this study has several limitations to account for. First, groups were of a limited number and different sizes, which can have affected the statistical power despite winsorization, impeding the generalizability of the results. Groups also differ in family composition and distribution of adversities, which can have influenced the results, but it was not checked because it is outside the focus of this study (Park & Lee, 2020). Further, the employment of the TSIA and investigation of the interaction of attachment and alexithymia in these groups are innovative and pioneering attempts, but the absence of a literature background limited the interpretation of results. Even the analysis of differences related to the informant or assessment method is more descriptive than substantial, as it is outside the focus of the study.

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5 | CONCLUSION

This study has the strengths to offer for the first time a three-group comparison of adolescents in scarcely studied populations, employing for the first time the TSIA in the three groups and offering a mixed-method exploration of the role of attachment and alexithymia on adolescents' emotional–behavioural problems.

Overall, the findings seem to indicate a cumulative effect of attachment insecurity and alexithymia in all adolescents, irrespective of differences between groups in terms of baseline vulnerability. This may suggest keeping the investigation on the nature of relationships between attachment and alexithymia regarding the adolescent's emotional–behavioural problems through larger studies, also considering reciprocal moderating effects (Schimmenti & Caretti, 2018).

Lastly, results suggest a mixed-method approach as a promising approach to overcome certain limits of self-report measure, especially of IPPA in institutionalized teenagers (Muzi et al., 2022), calling for more studies comparing the cost-effectiveness of the different approaches, that is, interview-based, questionnaire-based and mixed-method.

AUTHOR CONTRIBUTIONS

All listed authors actively contributed to all parts of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict or competing interests to disclose.

DATA AVAILABILITY STATEMENT

The dataset is available on request to the corresponding author.

ETHICS APPROVAL AND PATIENT CONSENT STATEMENT

This study is part of a research that received prior ethical approvals from the University's Department Ethical Committee (protocol n. 012) and the local Social Services for Minors (approval n. PG/2017/368220). All participants and their legal caretakers signed informed consent before the voluntary participation.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

N/A.

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