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Articles

A narrative review on alexithymia in adolescents with previous adverse experiences placed for adoption, in foster care, or institutions. Prevalence, gender differences, and relations with internalizing and externalizing symptoms

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Abstract

Alexithymia is a recognized risk factor for psychopathology, showing relationships with internalizing and externalizing symptoms. The prevalence of alexithymia ranges from 7-21% in low-risk community adolescents, especially girls. Further, few retrospective studies suggest a higher incidence in individuals with past traumatic experiences, but they are mostly on clinical adults. Therefore, the current narrative review aimed to examine the state-of-art of literature on alexithymia (in terms of prevalence, gender differences, and relationships with internalizing-externalizing symptoms), in non-clinical adolescents potentially at “high-risk” for alexithymia because placed for adoption, in foster care or institutions due to adverse and potentially traumatic experiences (parental abandonment, neglect, abuse, etc).

The review of the literature was computed on documents retrieved through electronic databases (ProQuest, PsycInfo, PsycArticles, PubMed, WOS, Scopus, Google Scholar), included according to their pertinence and type (empirical studies). Of 6379 documents, only 6 studies (0.2%) on institutionalized adolescents met the inclusion criteria, none in adopted and foster care groups.

Main results revealed: 1) higher prevalence of alexithymia in institutionalized adolescents (38-85%) compared to community peers; 2) institutionalized girls as more alexithymic, showing more difficulty in identifying and describing feelings than boys, like in community groups; 3) Higher alexithymia was related to more total, internalizing and externalizing problems through similar mechanisms of risk than in community groups. Methodological limits and future directions of research are discussed for each topic, highlighting the need to bridge the research gap on adolescents with adverse backgrounds, potentially at “high-risk” for alexithymia and its negative consequences.

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1. Introduction

Alexithymia is a multidimensional construct, defined by (1) *difficulties identifying feelings* (DIF), i.e. to discriminate between bodily sensations and emotions; (2) *difficulties describing feelings* (DDF), i.e. to find the words to verbalize bodily sensations and emotions; (3) *externally oriented thinking* (EOT), i.e. a cognitive style reflected in a communicative mode focused on concrete and pragmatic aspects of the existence; (4) *lack of imagination*, (IP), reflected in a scarce use of fantasy (Nemiah et al., 1976).

Alexithymia is considered a characteristic of the personality normally distributed in the population, showed at high levels by around 10% of adults, and it has captured the interest of researchers because it shows broad relationships with physical and psychopathological symptoms during adulthood, for which is considered a "transdiagnostic risk factor" (Franz et al., 2008; Messina et al., 2014; Taylor & Bagby, 2012).

Findings on adults suggest a developmental origin for the alexithymia, showed at higher levels by adults with histories of severe and repetitive failures in interpersonal affective regulation processes since infancy, for instance when primary caregivers show alexithymia themselves, which can setback parents' ability to support their babies to learn how to recognize and name bodily sensations and emotions (Messina et al., 2014; Pellerone et al., 2017; Taylor, 2010).

Within this perspective, signs in the bud of the alexithymia can be traceable before adulthood, such as during adolescence, when stable personality characteristics are developing (Messina et al., 2014; Taylor, 2010).

Therefore, in the last two decades, researchers started to investigate alexithymia in adolescents to increase the knowledge of its etiology. Moreover, the study of a possible risk factor like alexithymia can have a preventive utility during adolescence when the vulnerability to psychopathological symptoms is greater, and the awareness of bodily sensations and emotion regulation abilities strongly contribute to this vulnerability (Das et al., 2016; Krystal, 1988; Merlo, 2019; Pace & Muzi, 2019; Pace et al., 2016; Parker et al., 2010; Settineri, 2019; Samur et al., 2013).

The study of alexithymia in adolescents has been challenging for the difficulty of capture a characteristic of the personality during its development, before it becomes a stable trait, and moreover through tools mostly designed to assess alexithymia in adults (Loas et al., 2017; Parker et al., 2010).

Indeed, almost all the published studies with adolescents employ the twenty-item Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994), which provides a global score of alexithymia that is the sum of the scores in three scales for the dimensions (i.e. factors) DIF, DDF, and EOT. The TAS-20 has the strength to be the most used measure of alexithymia, and to show

good psychometric proprieties in adolescent population, except for factor EOT (Loas et al., 2017; Parker et al., 2010). However, the use of the TAS-20 with adolescents raised doubts if used to classify prevalence through cut-off scores (Taylor et al., 1997), which are calibrated on adults and may lead to an over-rate of alexithymia in adolescents (Parker et al., 2010). The TAS-20 also appears poorly efficient if used under 13 years of age, therefore it has been developed an age-adapted version of the TAS-20 called Alexithymia Questionnaire for Children (AQC; Rieffe et al., 2006), which is suitable to be used in middle childhood up to 13 years old, but it is still little used despite good psychometric properties (Di Trani et al., 2018; Loas et al., 2017). Few studies on community adolescents (e.g. Dorard et al., 2008; Moriguchi et al., 2007) also employed other measures for alexithymia, such as the Beth Israel Hospital Psychosomatic Questionnaire (BIQ; Sifneos, 1973) and the Observer Alexithymia Scale (OAS; Haviland et al., 2000), while the Bermond-Vorst Alexithymia Questionnaire (Vorst & Bermond, 2000) and the interview based on the TAS-20, the Toronto Structured Interview for Alexithymia (TSIA; Bagby et al., 2006) have been used with clinical groups (Balottin et al. 2014; Deborde et al., 2008).

Beyond the difficulties of measuring the construct, overall the results of the studies supported the utility to study alexithymia in adolescents, who show higher prevalence rates than adults, a different gender distribution but overlapping links with psychopathological symptoms (Honkalampi et al., 2009; Uzal et al., 2018; Di Trani et al., 2013)

Indeed, according to international studies, the pooled prevalence of border-alexithymic and alexithymic classifications ranges from 7.3% to 21% in low-risk community adolescents aged 11-19 years, as established through the Alexithymia Questionnaire for Children (AQC; Rieffe et al., 2006) or, more often, through the application of the cut-off scores of the Toronto Alexithymia Scale 20-items (TAS-20, Bagby et al., 1994), which raises methodological concerns because of the risk to over-estimate alexithymia in adolescents (Gatta et al., 2014; Parker et al., 2010; Uzal et al., 2018). The incidence of alexithymia results greater in girls, due to their higher difficulties in identifying and describing feelings compared to boys, who in turn may show higher EOT (Honkalampi et al., 2009; Karukivi et al., 2010a, 2010b; Garish & Wilson, 2010; Gatta et al., 2014; La Ferlita et al., 2007; Mannarini et al., 2016; Patwardhan et al., 2019; Sayar et al., 2005; Uzal et al., 2018; van der Crujisen et al., 2019; Zimmermann et al., 2006).

Additionally, like in adults, the higher alexithymia in community adolescents shows relations with higher levels of internalizing symptoms, such as depression, anxiety and somatic complains, and externalizing symptoms, like aggressive, opposite-deviant and delinquent behaviors (Allen, et al., 2011; Di Trani et al., 2013; Honkalampi et al., 2009; Lavaf et al., 2016). Moreover, adolescents' higher alexithymia also show relations with other problems such as eating disorders, gambling disorder, self-harm, suicidality, and dissociative symptoms, overall increasing the total level of symptoms (Caretto et al., 2005; Howe-Martin et al., 2012; Karukivi et al., 2010a; 2010b;

Garish et al., 2010; Gatta et al., 2016; La Ferlita et al., 2007; Parker et al., 2005; Patwardhan et al., 2019; Prino et al., 2019; Rieffe et al., 2010; Shank et al., 2019; van der Crujisen et al., 2019).

As further confirmation of the links between alexithymia and adolescent's psychopathology, case-control studies always reported higher alexithymia in clinical teenagers than in community peers (Ballarotto et al., 2018; Basile et al., 2009; Deborde et al., 2012; Donfrancesco et al., 2013; Gatta et al., 2011, 2016; Loas et al., 2012; Zimmerman, 2006; Zonneville-Bender et al. 2004).

To further improve the knowledge of the topic, it could be particularly informative to focus research attention on groups of adolescents who are not "classified" as "clinical", as they not necessarily show clusters of symptoms typical of certain diagnoses, but who are considered groups worthy of clinical attention for other reasons observable in the passage from research to practice in clinical psychology (Settineri, 2019). In other words, groups of adolescents who can be expected at "high risk" to show high alexithymia for reasons traceable in their development histories, for instance, early adverse experiences in the environment of the origin, such as neglect, abuse, parental death, abandonment, or incarceration (American Psychiatric Association [APA] Thesaurus; Felitti et al, 1998; Schimmenti & Caretti, 2018). Especially if perpetuated by primary caregivers, such experiences can severely damage the aforementioned parent-child processes of interpersonal affective regulation, overwhelming the immature system of the baby, who can start to "block" the experience of the emotions, perceived as dangerous (Krystal, 1988). As a consequence of the blocking of the emotional experience due to the relational trauma(s), the development of the affect regulation skills can be inhibited, and these infants can show more alexithymia in later stages (Krystal, 1988).

In support of this hypothesis, retrospective studies found higher alexithymia in adults with high rates of previous traumatic experiences, and few studies with abused children found similar results, directing the attention on "non-clinical" groups with adverse backgrounds (Boisjoli et al. 2019; Krystal, 1988; Sayar et al., 2005; Schimmenti & Caretti, 2018). Examples of such groups could be adolescents placed for adoption or in foster care or institutional care due to adverse experiences they had lived in their environments of origin because abandoned, or orphans, or removed from their family of origin because of severe child's neglect or abuse, or parental declared inability due to severe physical or psychiatric disability, substance abuse or incarceration (Gray et al., 2015).

Due to such adverse backgrounds, adolescents belonging with these groups may be at "high-risk" to show more alexithymia than community peers who without early relational adversities.

Moreover, these groups of adolescents also show higher rates of internalizing-externalizing symptoms than low-risk community peers, suggesting the study of alexithymia as potentially helpful for the risk assessment in these groups (Barroso et al., 2017; Campos et al., 2019; Greeson et al., 2011).

1.1 Objectives and rationale

Given the aforementioned premises, this paper reviewed literature on alexithymia in adolescents placed for adoption, in foster-care or in institutions, with the following objectives:

- (1) To synthesize knowledge on the *prevalence* of alexithymia in these groups, with the rationale to check if these groups, characterized by a higher incidence of adverse traumatic experiences, actually show more alexithymia.
- (2) To examine *gender differences* in alexithymia within these groups, in order to check similarities or differences with low-risk community groups.
- (3) To examine *relationships between alexithymia and internalizing-externalizing symptoms*, in order to check if manifestations of this risk factor in these groups overlap with those in community groups, or if they present peculiarities.

2. Methods

This paper employed a narrative review research design, namely a methodological approach which employ the research method of a systematic review and a qualitative critical approach to the discussion of the results (Green et al., 2006). The purpose of a narrative interview is to synthesize literature findings about a specific topic, improving theoretical knowledge on it, through a critical analysis on the state-of-art, gaps and future directions (Green et al., 2006).

According to the suggestions by Ferrari (2015) to write a narrative review, the current research was conducted in the following steps:

- (1) Identification of a topic of interest and objectives (alexithymia's prevalence, gender differences and relationships with internalizing-externalizing symptoms in adolescents placed for adoption, foster-care and institutions), which defined the further organization of results;
- (2) Literature search (definition of searching strategy and screening of results);
- (3) Summary of results and discussion for each objective;
- (4) Conclusions.
- (5) Writing of the abstract.

2.1 Searching strategy

Preliminary, it was checked the absence of reviews or meta-analyses (done or in-progress) on the same topic, through a search with the keyword "alexithymia" international databases PROSPERO, Cochrane Database of Systematic Reviews (CDRS) and Centre for Reviews and Dissemination (CRD). A total of 24 reviews were found (3 published and 21 on-going), none of the current topic.

Therefore, an extensive research was performed from April to July 2020 on databases ProQuest, PsycInfo, PsycArticles, PubMed, Web of Science, Scopus, plus Google scholar to identify additional records from other sources (research networks or unpublished or pre-print papers or dissertations).

2.2 Search terms

Table1 reports combination of keywords used in the current review.

Table1. Combination of keywords (filter) used for literature search ^(a) on alexithymia in adolescents placed for adoption in foster care or in institutions ^(b) .	
Construct	Filter (keywords)
Adopted adolescents	ado* or adop* or adopted child or adoption or adoptee or adopted or acogimiento or adoção or adozione or adoptie
Foster care adolescents	foster care or foster children or foster care system or custodia familiar or custódia familiar or affidamento familiare or custodia familiei
Institutionalized adolescents	institutionalized children OR institutionaliz* OR institucion* OR residential-care OR "comunità di accoglienza" OR residencia* OR resident OR rezidențial OR out-of-home OR looked after OR group home OR orphan* OR orph* OR orfa*
Boolean operator	AND
Alexithymia	alexithymia or alexitimia or alexitimie or alessitimia or "Toronto Alexithymia Scale" or "Questionnaire to Assess Alexithymia for Adolescents" or "Alexithymia Questionnaire for Children" or "Toronto Structured Interview for Alexithymia" or "TSIA" or "TAS-20" or "Rorschach Alexithymia Scale" or "Observer Alexithymia Scale" or "Bermond-Vorst Alexithymia Questionnaire" or "BVAQ" or "BIQ" or "Beth Israel Hospital Psychosomatic Questionnaire" or "DCPR-A"

^(a) 1st search: adopted adolescents AND alexithymia; 2nd search: foster care adolescents AND alexithymia; 3rd search; institutionalized adolescents AND alexithymia. ^(b)searched with the keyword “child” (0-19 years) and further screened involving only studies with participants aged 10-19 years.

Given that all studies on alexithymia in adolescents usually provide information about prevalence, gender distribution, and relationships with problems, selected keywords focused only on the targeted groups (adolescents placed for adoption, foster care or in institutions) and on the construct alexithymia, with their combination defined by the use of the Boolean “AND” operator.

Keywords were designed to capture titles, abstracts, or keywords written in English or Romance languages (Spanish, Portuguese, French, Italian, and Romanian), according to the author's ability to independently perform reliable screening of abstracts. To find more papers on alexithymia, names or abbreviation for common measures of this construct (Sekely et al., 2018) have been included, e.g. "Toronto Alexithymia Scale" and "TAS-20".

Three searches were performed, separately for each group, with combinations of keywords as detailed in Table 1. When the database allowed, an advanced search was carried out by setting age limits (childhood and adolescence, 0-19 years) and/or the type of document, according to the inclusion criteria reported below (e.g. excluding reviews, meta-analyses or qualitative and case studies, see below).

The records of the documents were exported in .RIS packages and transferred to the Zotero data manager, which was used for the first removal of duplicates, i.e. copies of the same document in different databases, further checked manually to remove those duplicates that Zotero did not identify.

2.3 Selection criteria

The inclusion/exclusion criteria for the papers were four:

- 1) Age: only studies involving participants in middle childhood and adolescence (age range 10-19 years) were selected, to better compare with the available studies in community groups.
- 2) Pertinence: only papers targeting specifically alexithymia - as assessed by the measures defined by the keywords in the filter - in the targeted groups (adopted, in foster care, and institutionalized adolescents) were included. Papers on related but different constructs than alexithymia such as "emotion regulation" or "affective awareness" were excluded.

Concerning the targeted groups, only papers that documented a participant's background of adverse and potentially traumatic experiences (as defined by the introduction) were included. Among them, studies where participants had diagnoses for intellectual or physical disabilities or diagnoses of psychosis were excluded, as conditions affecting the response to the assessment through measures designed for community groups. For this reason, papers involving participants in residential treatment for psychotic disorders or disabilities were excluded;

- 3) Type: only original empirical studies (research articles, brief reports or short communications, conference abstracts and papers, and experimental dissertations) were included, while reviews,

meta-analyses, case studies, and qualitative studies were excluded. Multiple studies with the same sample which reported duplicate information were included only if they add novelty for the objectives of this review (e.g. one study with prevalence, another assessing the gender differences).

4) Language: only papers with the title, the abstract or keywords written in English or another Romance language (Spanish, Portuguese, French, Italian, and Romanian) were included. When the abstract was in an included language (e.g. English) but the paper in another non-selected language (e.g. Turkish), authors were contacted to obtain more information in one of the selected languages. The author(s) were also contacted to ask detailed information when papers were selected as pertinent but they did not include some useful information for the objectives of this review. Papers using different languages were excluded through the selection of the keywords, given that the author would not have been able to discriminate independently if they met the inclusion/exclusion criteria.

As shown in the flow-chart in Figure1, 25513 duplicates were identified and removed, and aforementioned inclusion criteria were applied to the remaining 6379 documents, of which 3852 articles (included brief reports, short communications, and qualitative studies), 2186 dissertations, 92 books and book chapters, 133 reviews and meta-analyses, 1853 conference abstracts, and 6 documents from other sources (not scientific journals, editorials, working report).

Among 15 abstracts selected at the first screening, only six full-texts were included in this review, 0.9% of the total amount of documents screened, while the others were excluded for reasons detailed in Figure1.

Specifically, the 1st search allowed identifying only one study by the author involving adopted teenagers (0.1%; Muzi, 2018), which was excluded because nine of the ten adopted participants (90%) do not fully met the inclusion criterion of pertinence as they were ascertaining the presence of diagnosis for mild intellectual disability at the time of data collection.

The 2nd search allowed selecting four studies on adolescents in foster care (0.6%): one study (Paull, 2013) reports data about an institutionalized subgroup, thus it was included in this review within the 3rd search. The other three studies (Boisjoli et al., 2019; Hèbert et al., 2018; Pihet et al., 2012) include subgroups of adolescents in foster care within larger samples, respectively 15.5% (n = 41, age range 8-12 years), 2-3% (around 163 participants in “foster care or other living arrangements”, aged 15 years), and 2% (n = 3, age range 12-18 years). These articles do

not provide information about potentially traumatic experiences in the adolescent’s background (inclusion criterion), nor specific information about alexithymia in foster care subgroups. Authors were contacted to obtain information about the objectives of the review in their foster care participants older than 10 years old, but it was not possible to find this information as authors were unavailable within the time of publication, so these studies were not included in this review.

The 3rd search allowed selecting eleven studies (1.7% of the total), of which four studies were excluded because the full-text specify that participants were in psychiatric residential treatment for intellectual disabilities or psychosis, one was excluded as a qualitative study, and the remaining six are all the studies included in this review.

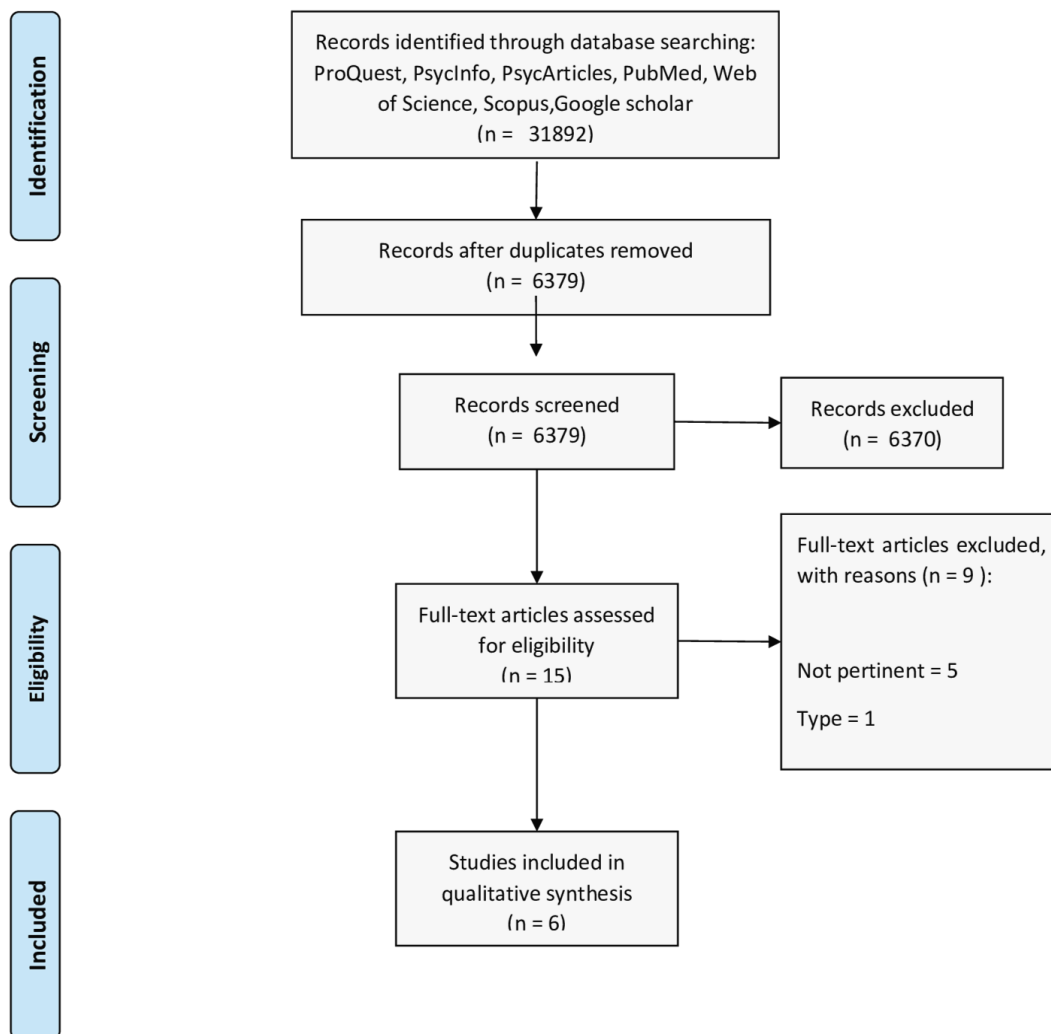


Figure1. Flowchart of narrative review on alexithymia in adolescents placed for adoption, in foster care, and institutions.

Details (participants, type, research design and measures) for selected articles, all on institutionalized adolescents, are reported in Table2.

Table2. Full-texts selected for the narrative review on alexithymia in adolescents placed for adoption, in foster care and institutions.

Authors (year)	Country	Type of document	Study design	Participants		Measures	
				Age range (in years)	N (% males [M])	Alexithymia	Internalizing and externalizing symptoms
Erden (2005)	Turkey	Article	Case- control	17-18	30 RC (57% M) vs. 30 controls (33% M)	Toronto Alexithymia Scale (TAS- 20)	BDI, SCL-90
Powell et al. (2011)	USA	Article	Population	12-17	67 RC (57% M)	TAS-20, Emotion Awareness Questionnaire (EAQ-26)	YCRA
Manninen et al. (2011)	Finland	Article	Case- control	15-18	47 (61% M) vs. 6000 controls (49% M)	TAS-20	YSR, CBCL
Paull (2013)	UK	Ph.D dissertatio n	Case- control	16-22	43 RC vs. 43 controls (40% M each group)	TAS-20	SCL-90
Muzi et al. (2019) ^(a)	Italy	Conferenc e abstract	Population	12-18	26 (54% M)	TAS-20, Toronto Structured Interview for Alexithymia (TSIA)	CBCL
Muzi & Pace (2020) ^(a)		Article		13-18	20 (65% M)	TAS-20	YSR

^(a) Samples are part of the same research. TAS-20 (Bagby et al., 1994), EAQ-26 (Rieffe et al., 2007); TSIA (Bagby et al., 2006), BDI= Beck Depression Inventory (Beck et al., 1961); YCRA=Youth comprehensive risk assessment (Coll et al., 2003); SCL-90 = Symptoms Check List-90 items (Derogatis, 1994); YSR = Youth Self Report 11-18 years and Child Behavior Check List 6-18 years (Achenbach & Rescorla, 2001).

3. Results and discussion

Table3 shows results for the review on prevalence and gender differences with data requested to author(s) in two cases (b). **(Unpublished data about prevalence and gender differences have been requested to Erden (2005), who could not supply them because they were no longer accessible).**

Table3. Studies reporting alexithymia prevalence^(a) and gender differences in institutionalized adolescents.

Study	Prevalence %			Gender differences
	Total	Border	Alexithymic	
Powell et al. (2011)	52%	30%	22%	Girls showed higher total scores in EAQ-30 ($p = .049$).
Manninen et al. (2011)	38%	17%	21%	Girls received more alexithymic classifications (33% vs. 14% M, $p = .003$). Boys showed higher scores of EOT ($p = .014$).
Paull (2013)	45.2%			Girls of the total sample received more alexithymic classifications (49% vs. 26.5% M, $p = .001$). Girls showed higher scores of DIF, $p < .05$.
Muzi et al. (2019, 2020) ^(b)	85%	35%	50%	Girls showed higher scores of DIF, p from .03 to .004, and DDF, $p = .013$

^(a)TAS-20 cut-off scores (Taylor et al., 1997): Border-alexithymic with scores > 51 , alexithymic with scores > 60 . ^(b) as partials of the same research, prevalence of the study with more participants was considered, summarizing results on gender differences. Data were unpublished, provided by authors for this review on request. See Table1 for details on participants, research design and measures.

3.1 Prevalence and comparison with community samples.

All reviewed studies assessed prevalence through the scores of the Toronto Alexithymia Scale 20-item and, as shown in Table3, the pooled prevalence range of teenagers classified as border-alexithymic a/o alexithymic results strongly higher in institutionalized adolescents (38-85%) with adverse histories than

in community ones assessed with the same measure (7.3-19.2%; Honkalampi et al., 2009; Uzal et al., 2018).

Given that the application of the Toronto Alexithymia Scale cut-off scores to classify adolescents has been highlighted as possibly misleading, running the risk to over-rate alexithymia in adolescents (Parker et al., 2010), four studies also compared alexithymia's scores of institutionalized participants with the community or normative ones, always reporting significantly higher scores of alexithymia in institutionalized teenagers (Erden, 2005; Manninen et al., 2011; Muzi & Pace, 2020; Powell et al., 2011).

In particular, Powell et al. (2011) found that the mean score of total alexithymia of their institutionalized group at the Toronto Alexithymia Scale was closer to the average in psychiatric groups than in normative ones.

In order to detect the source of such group differences, three studies also report the comparison on alexithymia's factors, reporting all the times the difficulty describing feelings as significantly higher in the institutionalized group, the externally oriented thinking in two studies and the difficulty identifying feelings just in one (Manninen et al., 2011; Muzi & Pace, 2020; Paull, 2013). This underlines a possible peculiarity of institutionalized groups, as community findings attributed to the difficulty identifying feelings a relevant role in adolescent's alexithymia, stressing the instability of the externally oriented thinking factor, while these results seem suggest that this factor could have a greater impact in increasing the alexithymia prevalence in institutionalized groups (Loas et al., 2017; Parker et al., 2010).

3.2 Gender differences

As shown in Table 3, gender differences in alexithymia prevalence were significant in two cases, revealing girls as more alexithymic, in line with literature on community samples (Honkalampi et al., 2009; Manninen et al., 2011; Paull, 2013).

Moreover, comparison on scores seems to suggest the higher prevalence in girls as due to their higher scores in factors difficulty identifying feelings and difficulty describing feelings compared to boys, who in turn show more externally oriented thinking, in line with several community findings (Karukivi et al., 2010a, 2010b; Muzi et al., 2019; Muzi & Pace, 2020; Paull, 2013; Patwardhan et al., 2019; Pellerone et al. 2016; Sayar et al., 2005; van der Crujisen et al., 2019).

Relationships with internalizing and externalizing symptoms.

Table4 shows outcomes for review on relationships between alexithymia and internalizing-externalizing symptoms, available for all studies.

Table4. Studies^(a) reporting relationships between alexithymia and internalizing-externalizing symptoms in institutionalized adolescents.

Study	Relationships with internalizing-externalizing symptoms
Erden (2005)	Higher alexithymia was related to higher internalizing symptoms only in RC group ($r = .47$), predicting 22% of depressive symptoms in the BDI (adj. $R^2 = .22, p < .01$).
Powell et al. (2011)	No relationships between TAS-20, EAQ-26 and YCRA were found.
Manninen et al. (2011)	Higher scores of a total alexithymia were related to more total ($r_s = .57$), internalizing ($r_s = .59$) and externalizing ($r_s = .36$) symptoms, all related also to higher DIF (respectively $r_s = .65, r_s = .62$ and $r_s = .41$), all $p < .05$. Factor DDF was related to more total ($r_s = .46$) and internalizing symptoms ($r = .51$).
Paull (2013)	Higher scores of total alexithymia were related to more total symptoms ($r_s = .38$), which were related also to more DIF ($r_s = .50$) and DDF ($r_s = .29$), all $p < .01$. Together with insecure attachment styles, higher alexithymia predicted 32% of symptoms scores (adj. $R^2 = .32, p < .01$), with DIF as unique significant predictor ($\beta = .42$).
Muzi et al. (2019, 2020) ^(b)	Higher scores of total alexithymia ($r_s = .44$) and DDF ($r_s = .49$) showed relations with total symptoms, both $p < .01$ ^(a) . Higher scores of DIF ($r_s = .41, p = .04$) and DDF ($r_s = .51, p = .009$) showed correlations with internalizing symptoms, while EOT with externalizing ones ($r_s = .48, p < .05$). Factor DIF and DDF, together with attachment disorganization, predicted 22% of internalizing symptoms (adj. $R^2 = .22, p = .05$)

^(a)See Table1 for details on participants, research design and measures. ^(b)as partials of the same research, results of the two studies were summarized.

Except for Powell et al. (2011), all reviewed studies confirmed relationships between more internalizing-externalizing problems and higher levels of alexithymia, extending to institutionalized adolescents the findings from community samples (Di Trani et al., 2013; Honkalampi et al., 2009; Lavaf et al., 2016). In particular, in two studies (Erden et al., 2005; Muzi & Pace., 2020), higher alexithymia predicted around 22% of internalizing problems, and overall correlations appeared stronger with internalizing problems than with externalizing ones through the studies, suggesting an

“elective” link with this type of symptoms (Allen et al., 2011; Garish et al., 2010; Gatta et al., 2014; Rieffe et al., 2010).

However, despite less strong, in three studies also externalizing problems showed correlations with alexithymia, in line with community findings (Di Trani et al., 2013; Honkalampi et al., 2009; Prino et al., 2009). Furthermore, two studies also found relationships with the total level of psychopathological symptoms, suggesting that higher alexithymia of institutionalized participants may also co-occur with more symptoms under different forms, such as binge drinking, dissociation or suicidal ideation, similarly of what observed in community peers (Caretta et al., 2005; Howe-Martin et al., 2012).

As further similar, results seem to support that such relationships between alexithymia and psychological symptoms may be primarily due to difficulties to identifying feelings, as only the factor difficulty identifying feelings showed relations with all type of problems through the studies (Manninen et al., 2011; Paull, 2013). Following, the difficulty in describing feelings was implied in relationships with total and internalizing problems, overall supporting the relevance attributed by literature on adolescent’s psychopathology to these two dimensions of alexithymia (Di Trani et al., 2013; Karukivi et al., 2014; Rieffe et al., 2006).

In this regard, it seems noteworthy that, in two studies, such factors acted together with attachment in predicting more total or internalizing problems, which may suggest mutual relationships between attachment and alexithymia in predicting symptoms of institutionalized adolescents, similarly on what observed in studies with adults with traumatic backgrounds (e.g. Carpenter & Chung, 2011).

Instead, an externally oriented cognitive style did not appear as related to symptoms showed by institutionalized teenagers, as only Muzi et al. (2019) found lower externalizing problems in participants with lower externally oriented thinking, like only Mannarini et al. (2016) among community studies, overall suggesting factor externally oriented thinking as poorly informative for the risk assessment of adolescents through alexithymia (Parker et al., 2010).

4. Conclusions

The general aim of this narrative review was to synthesize the state-of-art of literature on alexithymia in adolescents placed for adoption, in foster care or institutions due to their adverse and potentially traumatic backgrounds. Objectives of the review were alexithymia’s prevalence, gender differences, and relationships with internalizing-externalizing symptoms, to detect similarities of differences with community low-risk peers who did not experience adversities in their family of origin, and the review of the literature allowed to include only six studies, all on institutionalized adolescents.

At first, results on *prevalence* seem to confirm that institutionalized adolescents with early adverse backgrounds can be considered at “high-risk” for alexithymia, of which they showed higher levels

compared to community peers, supporting the hypothesis of higher incidence of alexithymia in case of past traumatic experiences (Schimmenti & Caretti, 2018).

However, five studies are too few to draw definitive conclusions, therefore it would suggest improving the research on alexithymia in institutionalized adolescents, to reach a more precise estimate of the incidence of alexithymia in this group, which may be useful to estimate the relevance of evaluating and intervening on this variable to support the emotional development of teenagers raised in institutions. In this regard, this review highlights a possible limit of current methods of assessment, as the included studies aligned with the general tendency to use only the classifications of the Toronto Alexithymia Scale to define the prevalence of alexithymia (Parker et al., 2010; Sekely et al., 2018). Since the reason could be a general lack of cut-off scores for adolescents, it may be suggested to implement research efforts to define age-adapted alexithymia categories with different tools (Deborde et al., 2008; Dorard et al., 2008; Rieffe et al., 2006). Larger availability of age-adapted tools could allow assessing the prevalence of alexithymia through a multi-method approach, which is highly recommended with adolescents but poorly applied, as only two of the five studies in this review done it (Erden, 2005; Muzi et al., 2019; Sekely et al., 2018).

Moreover, even if alexithymia is a dimensional construct that the literature suggests investigating with continuous measures, detecting the prevalence can still be useful at a first screening to define the relevance of the phenomenon in different groups, choosing those where it is more relevant to study it (Sekely et al., 2018).

In particular, results on *gender differences* suggest focusing attention to the group of institutionalized girls, who resulted more alexithymic, probably due to their higher difficulties to identifying and describing somatic sensations and emotions as aware feelings, in line of what observed in community samples (Pellerone et al., 2016).

Additionally, in line with community findings, results for the third objective seems to support that *higher alexithymia is related to higher psychopathology also in institutionalized adolescents, being a possible “transdiagnostic” risk factor for more symptoms in them, through similar mechanism observed in community groups* (Honkalampi et al., 2009).

Specifically, results seem to support that institutionalized adolescents with higher difficulty in identifying somatic sensations and emotions as meaningful feelings can be more prone to show internalizing-externalizing symptoms (Di Trani et al., 2013; Karukivi et al., 2014).

Moreover, it seems that institutionalized adolescents showing high difficulty in identifying feelings, together with more difficulty in describing them, may struggle to externally express their discomfort, being more prone to express it through internalizing symptoms such as anxious-depressive or somatic

ones. Instead, teenagers showing high difficulty in identifying feelings along with the tendency to focus on the external behavior might be more prone to externalize their internal discomfort through aggressive, opposite-deviant, and delinquent behaviors (Muzi et al., 2019).

In this regard, results may suggest the institutionalized girls as the sub-group more at risk, because they showed more alexithymia, in terms of difficulty in identifying and describing feelings, whereas the negative impact of the alexithymia on the psychopathology is generally stronger in girls than in boys (van der Crujisen et al., 2019).

However, it is impossible to draw definitive conclusions for different reasons: at first, the already mentioned paucity of studies, with few participants, in total 213 considering all samples. Secondly, institutionalized participants involved in these studies were very heterogeneous, because in two samples (Manninen et al., 2011; Powell et al., 2011) adolescents reported high rates of severe psychopathology at the moment of the institutionalization, while in the other three samples teenagers showed lower rates of diagnoses but higher rates of previous potentially traumatic experiences (Erden, 2005; Muzi & Pace, 2020; Paull, 2013). Thus, with so few, heterogeneous participants, it would be misleading to expect that the relationships between alexithymia and symptoms always manifest themselves in the same way, simply because participants share the residential contexts of life.

Third, conflicting results between these studies may be due to the method of measuring symptoms. For example, the absence of relations in Powell et al. (2011) could be due to the specificity of the Youth Comprehensive Risk Assessment, which assess isolated symptoms, e.g. sex-offending, or aggression, or destruction of property, whereas the Symptom Check List - 90 item, the Child Behavior Check List and the Youth Self Report group more symptoms in wider categories, such as externalizing problems, increasing the opportunity to detect relationships with alexithymia.

Lastly, also the method used to assess alexithymia may influence the results, since in Muzi et al. (2019) relationships with symptoms emerged only when alexithymia was assessed with the Toronto Alexithymia Scale but not with the interview Toronto Structured Interview for Alexithymia. This may support the concerns raised by different authors that the questionnaire could lead to an overestimation of adolescent's alexithymia and its relationships with symptoms, while the interview could be unsuitable to be used with adolescents (Caretto et al., 2005; Parker et al., 2010).

Despite these considerable limitations in existing literature, from this review, it is also possible to draw indications for future directions of research involving larger samples. For instance, the relationships between attachment and alexithymia to predict adolescent's psychopathology (Muzi & Pace, 2020; Pellerone et al., 2017, 2019; Schimmenti & Caretti, 2018). Or also the investigation of possible mediators or moderators of the relationships between alexithymia and internalizing-externalizing problems, such as variables that affect all adolescents like the severity of adolescent's psychopathology,

features of personality such as the narcissism, family functioning or values, and rates and impact of the previous adverse experiences (Chrétien et al., 2018; Deborde et al., 2012; Hèbert et al., 2018; Merlo, 2019; Musa et al., 2019; Pace et al., 2016; Pace & Muzi, 2019; Pellerone et al., 2017, 2019; Prino et al., 2019; Schimmenti & Caretti, 2018). Otherwise, environmental factors can moderate the effect of the alexithymia on the symptoms, such as features in the residential-care institutions like the influence of professional caregivers, which could be investigated with inter-country explorations (Mota & Matos, 2016; Muzi & Pace, 2020; Zegers et al., 2010).

Furthermore, the method of assessment for alexithymia or symptoms could influence these relationships in a way that should be further investigated, for example deepening the effect of the informant, due to discrepancies in symptoms' rating between adolescents and their caregivers in both high and low-risk samples (Achenbach et al., 2017; Askeland et al., 2017; Bronsard et al., 2016).

Last but not least, this review highlights a completely unexplored field of research, underlining the potential utility to start to study alexithymia in adopted and foster care adolescents, who experienced more adversities and show lower emotional understanding than community peers during childhood (Barone & Lionetti, 2013). Since these groups are also at "high-risk" for more internalizing-externalizing symptoms than community peers, further investigation on alexithymia as a possible risk factor in these groups could have important clinical implications for the risk assessment carried out by adoption and foster care professionals (Barone & Lionetti, 2013; Barroso et al., 2017; Greeson et al., 2011).

In conclusion, with future studies, it would be possible to bridge the information gap in these groups, as well as the wider gap between research on alexithymia and its clinical application, for example by adapting interventions aimed at reducing this "transdiagnostic" risk factor for these specific groups (Marchetti & Cavalli, 2012; Zorzella et al., 2020).

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