

Volume 8, n 3, 2020

Articles

A pilot study on alexithymia in adopted youths: prevalence and relationships with emotional-behavioral problems

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Abstract

Adopted adolescents show high rates of emotional-behavioral problems and they could also be more vulnerable to alexithymia, a risk factor for psychopathology in adolescents, that is more frequent in case of early relational trauma(s), often experienced by adoptees in pre-adoption life. However, no studies investigate alexithymia in adopted adolescents, therefore this pilot study aimed to: (a) assess the prevalence of alexithymia in adoptees in comparison with a national representative sample; (b) examine the relationships between alexithymia and emotional-behavioral problems in adoptees. *Participants* were 33 adoptees aged 10-19 years (54.5% boys), enrolled through social services. *Measures* were the self-report questionnaire Toronto Alexithymia Scale 20-item to measure participants' alexithymia, and the Youth Self Report 11-18 years to assess emotional-behavioral problems. *Main results* highlighted: 1) 71% of adoptees with moderate-to-high levels of alexithymia, with adoptees as significantly more border-alexithymic (55%) than in normative peers; 2) Alexithymia and its factors Difficulty to identifying Feelings and Externally Oriented Thinking were related to more total, internalizing, externalizing and other problems (social, attentional, thought, binge-drinking, substance abuse, suicidality, etc...); 3) The difficulty identifying feelings was the unique predictor for 38% of total problems, 40% of internalizing ones, 22% of externalizing ones and 30% of other problems. In *conclusion*, the results suggest the clinical and scientific relevance of continuing the study of alexithymia in adopted adolescents, and future directions of research are suggested.

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**Keywords:**

Alexithymia; Adopted child; Emotional-behavioral problems; Adolescence; Mixed-method.

**Received:** 12 August 2020

**Accepted:** 18 November 2020

**Published:** 19 December 2020

**Citation:** Muzi, S., Pace, C.S. (2020). A pilot study on alexithymia in adopted youth: prevalence and relationships with emotional-behavioral problems. *Mediterranean Journal of Clinical Psychology*, 8(3). <https://doi.org/10.6092/2282-1619/mjcp-2583>



1. Introduction

Adopted adolescents are an object of attention by practitioners and researchers in the field of clinical psychology, as they can be considered a “high-risk” group (American Psychiatric Association [APA] dictionary) for mental health problems and vulnerability in psychopathological risk factors (Askeland, 2017; Juffer & van IJzendoorn, 2005; Settineri, 2019).

Indeed, adopted adolescents show high rates of emotional-behavioral problems compared to non-adopted peers, in particular *externalizing* problems such as aggressive behaviors and delinquency, as well as *internalizing* forms such as anxiety, depression, and somatic complaints (Askeland, 2017; Barroso et al., 2017; Bimmel et al., 2003; Hawk & McCall, 2011). Moreover, adopted children show less emotional understanding than non-adopted peers, and during adolescence, their lower emotional regulation skills result connected to more behavioral problems (Barone & Lionetti, 2012; Batki, 2018; Pace & Muzi, 2017; Pace et al., 2018; Tottenham et al., 2010).

All these difficulties have been linked to *two peculiarities of adopted adolescents* (Juffer et al., 2011; Settineri, 2019): on one side, the *discontinuity of the caregiving*, as adopted children are not raised by biological parents but by adoptive parents who legally receive all parenting rights and responsibilities concerning the adopted child (International Adoption Commission, 2019). On the other side, adoptees are more exposed than non-adopted peers to adverse relational experiences during childhood, since common reasons to place a child for adoption are *adverse and potentially traumatic experiences* such as parents' loss or abandonment, or child's neglect and abuse within the family of origin (International Adoption Commission, 2019).

Especially such adverse pre-adoptive experiences have been related to adoptees' higher rates of emotional-behavioral and social problems during childhood and adolescence (Bimmel et al., 2003; Juffer & van IJzendoorn, 2005; Layne et al., 2014). In particular, adolescents adopted at older ages manifest more difficulties, attributed to longer exposure to eventual adversity before adoption, and also those coming from international countries can be more vulnerable due to social integration difficulties and/or somatic and cultural differences (Bimmel et al., 2003; Ferrari et al., 2015).

Further, the higher exposure to early adversities has been connected to adoptee's difficulties in emotional understanding, since discontinuity and/or traumatic interactions within primary caregivers can negatively affect early parent-child interpersonal affective regulation processes, making difficult for the child to acquire fundamental skills of emotional understanding and affective regulation (Carrera et al., 2020; Fries & Pollak, 2004; Krystal, 1988; Pace et al., 2018; Tottenham et al., 2010).

Within this perspective, adopted adolescents can be more vulnerable to primary *alexithymia*, a well-known "transdiagnostic" psychopathological risk factor (APA dictionary; Goerlich, 2018; Honkalampi et al., 2009; Krystal, 1988; Lumley et al., 2007; Messina et al., 2014; Parker et al., 2010; Taylor & Bagby, 2012). Firstly defined by Sifneos (1967), alexithymia is considered a deficit in emotional processing and awareness, usually defined by the following dimensions

(Bagby et al., 2006; Taylor et al., 1997): difficulties in identifying bodily sensations and emotions, i.e. difficulties in identifying feelings (DIF), difficulties to describe them verbally, i.e. in describing feelings (DDF); a cognitive tendency to focus on material aspects of existence, i.e. externally oriented thinking (EOT), and general poor use of fantasy, i.e. scarce imaginative processes (IP).

According to a development definition (Krystal, 1988; Messina et al., 2014; Taylor & Bagby, 2012), alexithymia stems within early interpersonal affective regulation processes with primary caregivers, who may differently support the child in recognizing and name bodily sensations and emotions, shaping the child's affective regulation acquisition, thus as an adult he/she shows different levels of alexithymia. Individuals tend to show more alexithymia in case of repeated and severe failures in these primary interpersonal processes, which are particularly damaged in case of adverse relational experiences with primary caregivers, indeed adults with histories of relational trauma show higher levels of alexithymia (Schimmenti & Caretti, 2018).

Also at earlier stages, when alexithymia is not yet a stable personality trait but it is traceable in form of poor affective awareness and regulation, children and adolescents more exposed to adverse and potentially traumatic experiences tend to show more alexithymia (Aust et al., 2013; Boisjoli et al. 2019; Chen & Chung, 2016; Erden, 2005; Goldsmith & Freyd, 2005; Manninen et al., 2011; Muzi, 2020; Muzi & Pace, 2020; Paivio & McCulloch, 2004; Paull, 2013; Powell et al., 2011; Sayar et al., 2005; Zlotnick et al., 2001).

For example, a recent review (Muzi, 2020) reports that 38-85% of adolescents placed in institutions show a moderate-to-high prevalence of alexithymia, whereas this prevalence ranges 7-21% in low-risk community adolescents, with a higher incidence in girls who result more alexithymic than boys in both types of group, due to more difficulty identifying and describing feelings (Gatta et al., 2014; Honkalampi et al., 2009; Karukivi et al., 2010a, 2010b; Mannarini et al., 2016; Patwardhan et al., 2019; Pellerone et al., 2016; Sayar et al., 2005; Uzal et al., 2018; van der Crujisen et al., 2019).

Further, higher alexithymia is considered a risk factor for more emotional-behavioral problems in both adolescents at low-risk or high-risk for traumatic experiences, showing similar mechanisms of risk (Di Trani et al., 2013; Erden, 2005; Honkalampi et al., 2009; Karukivi et al., 2010a, 2010b; Gatta et al., 2014; Mannarini et al., 2016; Manninen et al., 2011; Muzi, 2020; Patwardhan et al., 2019; Pellerone et al., 2016; Sayar & Kose, 2003, 2005; Uzal et al., 2018; van der Crujisen et al., 2019). Indeed, participant's higher levels of difficulty identifying feelings predict both internalizing and externalizing problems (Chen & Chung, 2016; Di Trani et al., 2013; Honkalampi et al., 2009; Lavaf et al., 2016; La Ferlita et al., 2007; Manninen et al., 2011;

Paull, 2013; Sayar & Kose, 2003); higher difficulties identifying and describing feelings tend to be more frequently associated with internalizing problems and more externally oriented thinking shows some relations with externalizing problems (Allen et al., 2011; Mannarini et al., 2016; Manninen et al., 2011; Muzi & Pace, 2020; Rieffe et al., 2006, 2010; Sayar et al., 2005; van der Cruisen et al., 2019). Further, higher total alexithymia is also related to greater *other problems*, e.g. social problems like substance and alcohol abuse (Gatta et al., 2014; Patwardhan et al., 2019).

Given that adopted adolescents constitute a community group at “high-risk” for adverse experiences in early parent-child relationships, they can also show higher levels of alexithymia than low-risk non-adopted peers especially in case of later age at adoption and /or its shorter length, as in these conditions the exposure to eventual adversity and the discontinuity of caregiving environments can be higher. Further, like in all adolescents, adoptees’ higher alexithymia can be linked to more emotional-behavioral problems in them, making it useful to study this construct in this group at high-risk for emotional-behavioral problems than non-adopted peers (Barroso et al., 2017).

However, the aforementioned review (Muzi, 2020) fails to find studies investigating alexithymia in adopted children and adolescents, thus this study had two aims:

(1) To determine the prevalence of alexithymia in a group of adopted adolescents, hypothesizing they as more alexithymic compared to a nationally representative community sample (Gatta et al., 2014).

(2) To investigate the relations between adoptees’ levels of alexithymia and their levels of emotional-behavioral problems. We hypothesized higher levels of emotional-behavioral problems of all types (total, internalizing, externalizing, and other) along with more total alexithymia and DIF, DDF as related only to internalizing problems, and EOT as related only to more externalizing ones.

## **2. Method**

### **2.1. Participants and procedure.**

33 adopted pre-adolescents and adolescents (10-19 years; Mean [M] = 14.8, Standard Deviation [SD] = 2.3; 54.5% boys) were recruited for larger mixed-method research (Muzi & Pace, 2020) with the collaboration of Social Services for domestic adoption and authorized institutions and associations for International Adoption (e.g. Centro Italiano Aiuti per L’infanzia [CIAI], Batya, Genitori Si Diventa [GSD]) in the Liguria region in the north-west of Italy.

Participants were involved in this study according to the following inclusion criteria: 1) age between 10 and 19 years; 2) absence of physical and intellectual disabilities or severe psychotic

symptoms. Of the 38 adoptees contacted between 2017 and 2019, five did not participate in the entire research (13%): one refused personally, two parents did not give the approval and the last two agreed to participate but they were impossible to contact at the moment of the data collection. Of the remained 33 participants, all were eligible for the current study (100%), of which one did not return the questionnaire without providing a reason, and two lacked time to complete the interview on one occasion, thus interviews contained too missing data to be rated. All participants filled the questionnaire for emotional-behavioral problems.

Adoptees came mostly from International Adoptions (79%; 46% East Europe, 21% Asia, 9% South America; 3% Africa), and they were all educated in Italy since primary school. The average age at adoption was 5 years old ( $SD = 3.2$ , range 1-12 years) within an adoption long on average of 9.5 years ( $SD = 3.7$ , range 3-17 years), in line with adoption's features reported in national stats (International Adoption Commission, 2019).

All adoptees were placed for adoption due to adverse experiences in the original caregiving environments (45% abuse or neglect, 33% abandonment, 9% declared parental incapacity due to severe psychiatric illness or substance abuse or incarceration, 3% parental death), followed by pre-adoptive placement in other forms of care (foster-care or residential-care) in 88% of cases, 27% of times with multiple placements and after adoption breakdown for 15% of them.

All adoptees came from intact adoptive families belonging to the middle-upper class, with adoptive parents aged 52.5 years on average ( $SD = 4$ ), who attended on average 15 years of education ( $SD = 3.9$ ) and at least one of the two parents with a full-time job.

All participants and their adoptive parents were verbally informed of the scope and procedure of the entire research before the data collection, and they provided written, informed consent for their voluntary participation. The procedure for the entire research was approved by the Ethical Committee of the Department of Educational Science, University of Genoa (protocol n.021), and complied with the ethical standards of the international scientific community. Adoptees were interviewed by the first author and filled questionnaires in home-visiting, in one meeting lasting around 1 hour and a half.

## 2.2 Measures

- The Toronto Alexithymia Scale 20 item (TAS-20; Bagby et al., 1994; Bressi et al., 1996) is a 20-item self-report questionnaire to assess alexithymia in subject aged 13-20 years, through a 5-point Likert scale (range 0 = "completely not agree" to 5 = "completely agree"). Alexithymia levels are assessed in a total score and three factors: 1) Difficulty in Identifying Feelings (DIF), which is the difficulty to identifying emotions and somatic sensations as personal and

meaningful feelings; 2) Difficulty in Describing Feelings (DDF), which is the difficulty in finding the words to verbally describe emotions and somatic sensations to others; 3) Externally Oriented Thinking (EOT), which is a tendency to pay attention to material aspects of the experience rather than to the inner world. Cut-off scores are also provided to classify individuals as “non-alexithymic” (lower than 51), “border-alexithymic” (from 51 to 60), and “alexithymic” (61 or more). Cronbach’s  $\alpha$  for internal consistency was .81 in the original version and .77 in the Italian version used for this study, with values ranging .40 -.65 when used with Italian pre-adolescents aged 12-13 years (Craparo et al., 2015). In this study, Cronbach's  $\alpha$  was .81.

- The Youth Self-Report 11-18 years (YSR; Achenbach & Rescorla, 2001; Frigerio et al., 2009) is a self-report questionnaire to assess the level of emotional-behavioral problems in the previous six months, rated by participants aged 11-18 years through 112 items with scores on a three-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very or often true). Scores are assigned to nine syndrome scales, summed in a scale for total problems, and also clustered in three scales for internalizing problems (withdrawn, somatic complaints, anxious/depressed), externalizing problems (delinquent and aggressive behaviors), and other problems (social, attentional, thought and identity-related problems). In the original version, Cronbach’s  $\alpha$  for internal validity ranged .71-.95 and it showed one-week *test-retest* reliability,  $r = .68$ , while in the Italian version used in this study Cronbach’s  $\alpha$  was  $> .78$ , and in this study, Cronbach’s  $\alpha$  was .85.

- The demographic data sheet (Pace et al., 2015), filled by adoptive mothers to collect demographic information about the adoptive family and the adoption (the reason for adoption, age of the child at placement, and its length; pre-adoption history; diagnosis and intervention, etc).

### 2.3 Analytic plan

Data were analyzed with the software IBM SPSS version 21, and the analyses were considered statistically significant with  $p > .05$ .

Preliminary internationally and domestically adopted participants were compared in age (t-test) and gender distribution (chi-square test) to check the absence of differences, and the same tests were used to compare boys and girls in the whole group.

The potential confounding effect of adoptee’s age, age at adoption, and its length on alexithymia and problems were checked using Pearson’s  $r$  correlation coefficient.

Mean scores and standard deviation of the adopted adolescents in the TAS-20 were reported in-text. The percentage distribution of alexithymia classifications of the adopted adolescents in

the TAS-20 was compared with those reported in the Italian community study with the larger adolescent sample ( $N = 3556$ ; Gatta et al., 2014) through chi-square test.

Pearson's  $r$  was used to explore the relationships among both TAS-20 scales and emotional-behavioral problems in the YSR scales for total, internalizing, externalizing, and other problems, while general linear regression was used to predict the variance in problems' scores based on alexithymia' scores.

### 3. Results

#### 3.1 Preliminary analyses and mean scores in the TAS-20.

Internationally and domestically adopted participants did not differ in age and gender distribution (all  $p > .09$ ), nor they show significant differences in the TAS-20 scores, thus they were further considered as a unique group.

No gender differences were found in TAS-20's scores, while younger participants showed higher scores of total alexithymia ( $r = -.37, p = .04$ ). Lastly, later age at adoption or its shorter length did not show correlations either with the TAS-20 or the YSR.

In the whole group of participants, mean scores in the TAS-20 were: total alexithymia 53.5 (SD = 8.9), DIF 16.7 (SD = 5.1), DDF 14.4 (SD = 4.7), EOT 21.8 (SD = 4.8).

Separately for gender, the average total score in boys was 52.6 (SD = 7.6) and 54.6 in girls (SD = 10.4); for DIF was 16.3 (SD = 4.7) in boys and 17.2 (SD = 5.6) in girls; for DDF was 14.5 (SD = 4.6) in boys and 15.4 (SD = 4.8 in boys); EOT was 21.7 (SD = 4) in boys and 22 (SD = 5.7) in girls.

#### 3.2 Prevalence of alexithymia in adopted youths

Contrary to expectations, no differences were found in percentage of participants classified as alexithymic ( $n = 5$ ), 16% in adoptees vs. 18% in community sample,  $X^2(1) = 1.12, p = .28$ . However, in line with the hypothesis, adoptees received significantly more border-alexithymic classifications ( $n = 18, 55\%$ ) than community peers (27%; Gatta et al., 2014),  $X^2(1) = 13.9, p < .01$ .

#### 3.3 Relationships between alexithymia and emotional-behavioral problems

Table1 shows correlations between TAS-20 and all the emotional-behavioral problems assessed with the YSR, partialized for age.

As expected, participants showed more total, internalizing, externalizing, and other problems along with more alexithymia and DIF.

Contrary to the expectations, no correlations emerged between internalizing problems and DDF, or between externalizing ones and EOT, which however showed positive relationships with internalizing and other problems.

**Table1.** Correlations between emotional-behavioral problems (Youth Self report 11-18 years, YSR) and alexithymia (Toronto Alexithymia Scale, TAS-20) in 33 adopted adolescents

YSR	TAS-20			
	Total	DIF	DDF	EOT
<b>Total</b>	.48**	.62**	-.10	.28
<b>Internalizing problems</b>	.59**	.65**	.02	.34*
Withdrawn/depressed	.59**	.46**	.16	.40*
Somatic complains	.43**	.45**	.33*	.20
Anxiety	.55**	.65**	-.04	.32*
<b>Externalizing problems</b>	.33**	.47**	-.08	.16
Delinquency	.32**	.46**	-.06	.12
Aggressive behavior	.28	.40*	-.09	.16
<b>Other problems</b>	.43**	.52**	-.14	.33*
Social problems	.37**	.37*	-.11	.36*
Thought problems	.23	.38*	-.09	.09
Attentional problems	.25	.40*	-.14	.15
Identity-related problems	.27	.47**	-.20	.17

One-side correlations, partialized for age; values are significant with  $p < .05$  and  $** .01$ . DIF = Difficulty Identifying Feelings; DDF = Difficulty Describing Feelings; EOT = Externally Oriented Thinking.

Therefore, based on preliminary analyses and correlations, only factor DIF was entered as a predictor for linear regressions on YSR total and externalizing problems' scores, while DIF and EOT were inserted as a predictor for internalizing and other problems. Age was not inserted as a predictor as already controlled through partialized correlations.

All prediction models were significant: factor DIF alone explained 38.5% of variance in total problems scores,  $F(1,30) = 20.4$ , adjusted  $R^2 = .385$ ,  $p = .000$  (95% CI - 16.7 - 37.31), and 22.4 % in externalizing ones,  $F(1,30) = 9.95$ , adjusted  $R^2 = .224$ ,  $p = .004$  (95% CI -10.7 - 7.64). Models with factor DIF and EOT together explained 40% of variance in internalizing problems,  $F(1,29) = 11.2$ , adjusted  $R^2 = .397$ ,  $p = .000$  (95% CI - 26.7 - 4.3), and 30% in other problems,  $F(1,29) = 7.62$ , adjusted  $R^2 = .300$ ,  $p = .002$  (95% CI - 11.3 - 3.6), but in both cases the analysis of  $\beta$  coefficients revealed factor DIF as a unique significant predictor.



#### 4. Discussion and conclusions

In this study, for the first time, alexithymia was explored in a sample of adopted adolescents, in terms of prevalence and relationships with emotional-behavioral problems.

At first, we established the *prevalence* of alexithymia through the application of cut-off scores of the widely known TAS-20 questionnaire, and 71% of adoptees showed moderate-to-high levels of alexithymia, far exceeding the 45% pooled prevalence in the low-risk nationally representative community sample (Gatta et al., 2014). However, contrary to the expectations, the percentage of adopted adolescents classified as alexithymic (16%) was almost equal, even slightly lower, than in the comparison sample (18%) and the difference between groups emerged only because most of the adoptees (55%) showed border-alexithymic classifications.

Therefore, adopted adolescents can be supposed at “moderate” risk of alexithymia, in a middle point between “high-risk” samples such as institutionalized adolescents, and normative samples of low-risk community adolescents (Muzi, 2020; Muzi & Pace, 2020). Given that the level of alexithymia was not related to adoption variables such as type of adoption, age at adoption, or its length (Bimmel et al., 2003), it can be assumed that a possible buffering effect of the adoptive condition on the vulnerability to alexithymia may come from “qualitative” aspects related to the adoption. For instance, the quality of parenting and/or features of adoptive parents, like their attachment states of mind or their reflective functioning abilities, which have been connected to improvements in emotional understanding of their children (Barone & Lionetti, 2012; Barone et al., 2017; Fonagy et al., 2002; Lèon, 2018; Pace et al., 2019; Pellerone et al., 2017).

Otherwise, this moderate difference could be related to adverse experiences lived in the original care environments before adoption, in continuity with the difficulties in emotional understanding found in adopted children (Barone & Lionetti, 2012). Future studies may investigate the role of the trauma, in terms of perceived impact and type, concerning the levels of alexithymia showed by adoptees, preferably comparing them to a low-risk community group (Chen & Chung, 2016; Leonardi et al., 2013). In this regard, Krystal (1988) underlines the role of early abuse and neglect, suggesting that children with neglecting caregivers could not have access to the aforementioned processes of interpersonal affective regulation, while children of abusers could be overwhelmed by the excessive intensity of the negative emotions experienced in the parent-child relationships, thus these children may defensively block the access to the emotions perceived as “dangerous”, with negative consequences for the development of their affective awareness (Schimmenti & Caretti, 2018). In line with this hypothesis, many studies report histories of abuse and neglect in the biographies of participants showing high levels of alexithymia, suggesting to investigate the impact of these type of experiences on adoptees’

alexithymia, since also most of the adopted participants were declared adoptable precisely because they were victims of abuse or neglect (Aust et al., 2013; Boisjoli et al. 2019; Chen & Chung, 2016; Erden, 2005; Muzi & Pace, 2020; Paull, 2013; Paivio & McCulloch, 2004; Sayar et al., 2005; Zlotnick et al., 2001).

Furthermore, in addition to the aforementioned environmental variables, the difference found could be due to personal characteristics of the adoptees, which can increase their vulnerability to alexithymia or mediate its risky role on emotional-behavioral problems, such as the adolescent's attachment (Craparo et al., 2018; Madigan et al., 2016; Pace et al., 2020a) or emotion regulation strategies (Muzi & Pace, 2020; Swart et al., 2009; Velotti et al., 2016).

A better understanding of the etiology of alexithymia in the adopted adolescents could have a preventive utility, as the results for the second aim confirmed positive *relationships between higher levels of alexithymia and more emotional-behavioral problems* in the adopted participants, supporting the role of alexithymia as “transdiagnostic” risk factor for more emotional-behavioral problems of all types in adopted adolescents, in line with wider literature findings (Chen & Chung, 2016; Di Trani et al., 2013; Honkalampi et al., 2009; Karukivi et al., 2010a, 2010b; Lumley et al., 2007; Manninen et al., 2011; Muzi, 2020).

In particular, the higher difficulty identifying feelings was related to all types of problems, confirming the hypotheses based on the literature on low and high-risk adolescents (Chen & Chung, 2016; Di Trani et al., 2013; Honkalampi et al., 2009; La Ferlita et al., 2007; Manninen et al., 2011; Paull, 2013; Sayar & Kose, 2003).

Instead, higher difficulty describing feelings did not show the expected relationships with more internalizing problems, except for the link with more somatic complaints, which suggests that adoptees less able to name their bodily sensations and emotions to share them in a conversation can be more prone to express disease through physical illness and symptoms, in line with other findings (Allen et al., 2011; Mannarini et al., 2016; Rieffe et al., 2006). Further, an externally cognitive thinking style was not related to more externalizing problems as the literature suggests (Mannarini et al., 2016; Muzi & Pace, 2020).

Coherently, the models of prediction (all significant) confirmed only the difficulty identifying feelings as predictive of more emotional-behavioral problems, and the stronger *prediction was on internalizing problems* (40%), confirming the elective links between alexithymia and anxious-depressive symptoms or somatic complaints (Honkalampi et al., 2009; Karukivi et al., 2010a, 2010b). Moreover, this study highlighted also the *predictive role of the difficulty identifying feelings on the other problems* (30%), usually poorly addressed by literature despite they include a set of

worrisome behaviors in adolescents, such as substance abuse, binge drinking, or being teased at or making fun of others and feeling clumsy in social relationships.

Taking together, these results suggest that adopted adolescents less able to recognize bodily sensations and emotions as feelings with personal meaning could be more at risk to show symptoms of anxiety and depression, somatic complaints, and to engage in aforementioned risky or socially inappropriate behaviors, i.e. other problems. Therefore, adopted adolescents could be helped to learn how to distinguish personal feelings as it could be implied in their social adaptation, enabling them to feel more comfortable in social relationships, which are so relevant for the identity definition during adolescence (Gatta et al., 2014; Patwardhan et al., 2019). All the reported relationships were independent by gender, which was not connected to alexithymia levels or emotional-behavioral problems showed by participants, contrasting literature findings (Gatta et al., 2014; Honkalampi et al., 2009; Karukivi et al., 2010a, 2010b; Pace & Muzi, 2017; Rescorla et al., 2012). Instead, in line with the literature, younger participants showed higher scores of alexithymia, thus the age was controlled in this study but the role of this variable could be further investigated as a possible source of methodological issues (Parker et al., 2010).

Overall, results of this pilot study suggest that it is clinically useful to continue studying alexithymia in adopted adolescents, to correctly estimate the degree of vulnerability to alexithymia in this group, and group-specific mechanisms by which alexithymia acts as a risk factor for more emotional-behavioral problems in adoptees, for example through the moderation of adoption variables (i.e. features of adoptive parents or impact of previous adverse experiences).

Of course, despite its originality, the results of this pilot study cannot be generalized due to several limits. At first, the small number of participants, which limited the power of statistical analyses, and adoptees came only from Liguria, so they cannot be considered representative of the national population of adopted adolescents. Moreover, despite good indexes of reliability in this study, the TAS-20 could be used from 13 years old, therefore its results on younger participants between 10 and 12 years ( $n = 6$ ) should be interpreted with caution because they are subject to statistical weakness. Furthermore, with adolescents is even more appropriate to use dimensional measures rather than categorical ones in assessing alexithymia, therefore a comparison on scores with a homogeneous non-adopted control group is needed to substantiate the results on prevalence. In this way, also the hypothesis of “moderate risk” of alexithymia in adoptees may be tested through a comparison with low-risk community peers and/or high-risk, such as an institutionalized group. Moreover, other variables should be related to the alexithymia and its consequences in adoptees, such as the subjective impact of traumatic experiences,

variables in adoptive parents, or adolescent's personality variables such as their attachment representations or their emotion regulation strategies within significant relationships (Carrera et al., 2020; Chen & Chung, 2016; Craparo et al., 2018; Muzi & Pace, 2020; Pace et al., 2018). In this regard, future studies could employ different measures to assess alexithymia and its related but different constructs, for instance employing the TAS and the Toronto Structured Interview for Alexithymia (TSIA; Bagby et al., 2006; Caretti et al., 2011) to assess alexithymia, together with a measure to assess adolescent's attachment representations (Jewell et al., 2019), such as the Adult Attachment Interview (AAI; George et al., 1985), or the Friends and Family Interview (FFI; Steele & Steele, 2005; Pace et al., 2020b) or the Child Attachment Interview (CAI; Bizzi et al., 2020; Shmueli-Goetz et al., 2008), as well as a reliable measure for emotion regulation within relationships such as the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer 2004; Lausi et al., 2020). Therefore, further multi-center, multi-dimensional and mixed-method national and international adoption studies are needed, possibly trauma-informed, with different age-appropriate measures of alexithymia, such as Alexithymia Questionnaire for Children (AQC; Di Trani et al., 2018; Rieffe et al., 2006) in the age range 10-12 years, and comparison groups at different levels of risk.

**Acknowledgments.** We thank all participants and their adoptive families, services for adoption, and the M.A. students involved in the data collection for the collaboration.

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**DOI:** 10.6092/2282-1619/mjcp-2583