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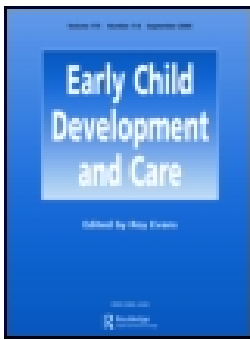**19** PUBLICATIONS **22** CITATIONS

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Sequential bilingualism and language impairment: the Persian version of ALDeQ parental questionnaire

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ABSTRACT

The aim of this cross-sectional study was to investigate the discriminant validity of the Persian version of Alberta Language Development Questionnaire (ALDeQ) in Turkish-Persian bilingual children, aged 75 months with 19 months of exposure to Persian, on average. The study sample included the parents of 22 bilingual children with language impairment (LI) and 114 with typical language development (TLD). The T-test results showed significant between-group differences regarding ALDeQ total scores, and for each section score, with medium to very large effect sizes. The linear discriminant function analysis showed the ALDeQ total score was a moderate to strong discriminator between TLD and LI group. The sensitivity and specificity of the questionnaire were 0.80 and 0.89, respectively. The Persian version of ALDeQ is an appropriate tool for assessing the language development of Turkish-Persian bilingual children and can be used in conjunction with other measures to identify children suspected of LI.

Introduction

The number of children, exposed to a language other than their first language (mother tongue) at school, is increasing worldwide (Lugo-Neris, Peña, Bedore, & Gillam, 2015; Pieretti & Roseberry-McKibbin, 2016). Nevertheless, in Iran, considering the ethnic diversity and monolingual education in Persian, exposure to a language other than the mother tongue is inevitable. According to the statistics in Iran, about half of Persian speakers are native speakers, and half speak alternate languages and dialects like Turkish, Kurdish, Lori, Baluchi and Arabic. (Allahkarami, Aliabadi, Sahraei, & Delavar, 2018; Dabir-Moghaddam, 2013). The Turkish Iranian community is much bigger in size and much more diverse (Dabir-Moghaddam, 2013; Nercissians, 2001) Persian is the language of formal education in Iran.

In spite of the plenty of definitions of bilingualism, all concur that bilingualism is a diverse and complex phenomenon on a continuum (Karami, 2016; Luk & Bialystok, 2013). The children in this study can be defined as bilinguals, because they speak and are exposed to two or more languages (De Lamo White & Jin, 2011) and as Sequential bilinguals, since their acquisition of the second

language (L2) started after mastering the basic linguistic skills in thier first language (L1) (Paradis, Nicoladis, Crago, & Genesee, 2011).

The prevalence of language impairment (LI) in bilingual children seems to be similar to monolingual children (Gillam, Peña, Bedore, Bohman, & Mendez-Perez, 2013). Bilingual children are sometimes overidentified with LI because educators do not have appropriate developmental expectations (Bedore & Pena, 2008; Pieretti & Roseberry-McKibbin, 2016), Also, LI may be underidentified because educators wait to identify LI after learning the L2. There are two interrelated reasons for this situation: First, there is limited normative data about the trajectory of early sequential bilingual language acquisition. Second, language assessment tools currently available are not appropriate for identification of LI in bilinguals because data on clinical markers for bilingual children are only beginning to emerge (Bedore & Pena, 2008; Pieretti & Roseberry-McKibbin, 2016).

In bilingual children when L1 is the minority language, it is not possible to reach the age-expected language proficiency in both languages as there is not enough time to acquire L2, and because children may be experiencing L1 attrition (Paradis, Emmerzael, & Duncan, 2010).

It should be noted that LI is not unique to one language because bilingual children may have distributed vocabulary knowledge across their two languages (Bedore & Pena, 2008), and examination of both languages can provide more comprehensive information about the child's lingual capacity, especially if he/she is more proficient in L1 (ASHA, 2004; Crago & Westernoff, 1997).

Exposure to, two languages, compared to one single language, makes bilingual children more likely to obtain lower scores on standard language tests in comparison with monolingual children; however, factors, such as the child's amount of exposure to each language, quality of exposure, and age, should be considered (Owens, 2012 & Thordardottir & Brandeker, 2013). The amount of exposure to each language influences the number of words in each language. Early exposure to L2 may result in a delay in L1 before it is mature. The context of exposure to each language and cross-linguistic influences may affect language performance in each language (Bedore & Pena, 2008; Owens, 2012).

Generally, identification and management of language impairment in bilingual children is complex and challenging processes, So far, different studies have highlighted the barriers to language evaluation in bilingualism (Paradis, 2005). These barriers include lack of standard language assessment tools, lack of norm-referenced language information in bilingual children, and shortage of bilingual speech and language pathologists to test or collect speech samples from L1 of children (Bedore & Pena, 2008).

Considering the obstacles to the clinical assessment of L1 in multilingual children, it is possible to collect indirect information about L1 development of children using a parent report. According to previous studies, this type of questionnaire has potential clinical values, and its results are consistent with standard test results in bilingual Spanish-English children (Dollaghan & Horner, 2011). Evidence suggests that the assessment results of a bilingual child's L1 development have a significant correlation with his/her actual language score, 'combination of the best scores in L1 & L2' (Lugo-Neris et al., 2015).

There are multiple questionnaires and checklists for parental reporting, such as Communicative Development Inventory (CDI), which examines the vocabulary and syntax of monolingual children. Also, some parental reporting questionnaires have been developed specifically to evaluate bilingual children, including the Alberta Language and Development Questionnaire (ALDeQ), Restrepo questionnaire, and Parents of Bilingual Children Questionnaire (PABIQ), which includes questions on the child's development and family history (Tuller, 2015).

ALDeQ was first developed by Paradis, Emmerzael, and Duncan in (2010) with the aim of collecting information about L1 development of sequential bilingual children. This questionnaire is not dependent on particular language or culture. It is a particularly applicable tool for diagnosis along with other evaluation methods, if it is not possible to directly assess L1 of sequential bilingual children and identify language impairments (Paradis et al., 2010). This questionnaire consists of four sections including Early Milestones, Current Abilities in the First Language, behaviour patterns and activity preferences

and final section aimed at collecting information on family history, which are described in more detail in the Methodology section.

Currently, there are no standard tools in Iran for detecting language impairments in bilingual or even monolingual children (Kazemi, 2014). Therefore, according to recent studies, the first step in the assessment of bilingualism is to develop appropriate diagnostic tools for identifying language impairments (Bedore & Pena, 2008). The aim of this study was to investigate the discriminant validity of the Persian version of ALDeQ among bilingual children to test whether ALDeQ is sensitive enough to differentiate between bilingual children with LI and TLD.

Methodology

This descriptive, cross-sectional study was conducted among the parents of 136 Turkish-Persian bilingual children (136 parents). Turkish-Persian bilingual children for testing were chosen for two reasons. First, these children had the highest number among the rest of the school-age bilingual children (Allahkarami et al., 2018). Second, author had a lot of clinical experience with Turkish-Persian bilingual children.

Children were selected from pre-schools, schools, and speech therapy clinics in Tehran, Iran, after collecting written informed consents from their parents. A total of 114 bilingual children with TLD aged range from 60 to 102 months, and 22 bilingual children with LI aged range from 60 to 120 months were evaluated in this study.

Because of the inadequate number of children with LI in aged range of 60–102 months, aged range of children with LI increased, and for reducing the effect of age, months of exposure, age of exposure, and non-verbal IQ on findings, all of them were controlled and there was no significant difference between LI and TLD statistically (Table 1).

Table 1 presents the descriptive characteristics of children and the results of Usage of Language Questionnaire to determine the children's age of exposure and duration of exposure to Persian language.

All Turkish-Persian bilingual children (Turkish as L1) had Turkish-speaking parents who spoke most often in Turkish together and with the other people at home. Parental self-rating showed the majority of parents were quite fluent in Persian and only few of parents were limited fluent. Some children were equally exposed to Turkish and Persian at home during questionnaire administration. However, an inclusion criterion of this study was limited exposure to Persian before pre-school and school ages; in fact, this criterion excluded simultaneous bilinguals (Genesee, Paradis, & Crago, 2004). All participants in the groups were sequential bilinguals (simultaneous bilinguals were excluded).

Although most children were exposed to Persian at the age of 54 months or older (Table 1), few children started learning Persian outdoors and before the age of two years. Table 1 shows that the TLD group was almost at the same age as the LI group at the onset of exposure to Persian (TLD = 56 vs. LI = 58). There was no significant difference between the groups in terms of exposure duration to Persian. Raven's Colored Progressive Matrices Test (Karami, 2016) was performed and non-verbal IQ of children was within the normal range and above 80 (see Table 1, NVIQ).

Children with hearing impairment, autism spectrum disorder, acquired neurological damage, or cognitive limitations such as Down's syndrome and apraxia, were not included. Bilingual children were recruited via convenience sampling, based on the diagnosis of two Turkish-Persian bilingual

Table 1. Children's age, age of exposure to Persian, months of exposure to Persian, and non-verbal IQs.

	N	Age, month (SD)	AOE	MOE	NVIQ
TLD	114	(8) 74	56(15)	18(14)	103(14)
LI	22	(Non-significant(ns (15) 77	58(17) ns	20(17) ns	(12)96

Note: TLD = typical language development, LI = language impairment, AOE = age of exposure to Persian in months, MOE = Months of exposure to Persian, NVIQ = non-verbal IQ, ns = non-significant. Standard deviations are in parentheses.

pathologists with at least three years of speech therapy experience with bilingual children as gold standard in this study.

Materials and data collection

Alberta Language Development Questionnaire (ALDeQ)

After obtaining permission from the questionnaire developer, (Paradis et al., 2010) was translated into Persian and culture-adjusted, based on the WHO translation protocols and finally back-translated into English. This questionnaire consists of 18 questions and four major sections:

Section A: early milestones

This section of the questionnaire evaluates the development of early milestones, such as child's expression of the first word or sentence and independent walking. It only contains four questions, which are very important in determining the developmental pattern of the child's L1. Two questions in this section are assigned six-point, while two other questions are assigned three-point scale. The total point of this section is 18. The complete Questionnaire and interpretation information are given in the appendix.

Section B: current abilities in the first language

This section requires the parents to comment on the child's current L1 abilities. This section consists of six questions (three-point scale) and a total point of 18. Questions 5–9 asked the parent to compare their child's linguistic abilities with those of other children whose L2 is Persian, whereas question 10 requires parents to compare their child's abilities with those of other children who share the same linguistic background. Also, a direct qualitative question was included in this section about the attrition of the child's L1 (*Do you think your child may be losing the mother tongue (Turkish) in favor of Persian?*), this question helps interpret the results of the questionnaire and is not scored.

Section C: behaviour patterns and activity preferences

This section aims to investigate disorders associated with LI, such as attention deficit, hyperactivity disorder and dyslexia. There are some indirect questions about behavioural disorders for example asking parents *does your child like to read books*? *What are the activity patterns shown by your child?* This section contains six questions (three-point scale) with a total point of 18.

Section D: family history

This section includes two questions related to the child's educational background and reading and writing difficulties in the family, both indirectly question 17(3 point) and directly question 18 (6 point). The total point of this section is 9, because accurate parent report of family history might not be easily obtained in some cases, this section has a smaller weight (9 points) than the other sections (Paradis et al., 2010).

Alberta Language Environment Questionnaire (ALEQ)

this instrument was translated in Persian and used informally to gain information about the usage of language including questions on the following topics: age of arrival in Tehran, parent education and self-rated fluency in Persian, current language use by family members at home, age at which the child began to here/use Persian at home and the richness of the child's Persian-language environment

information on language use in the home. The proportion of overall Persian use in the home, The proportion used by family members (input) and The proportion of Persian the child used with family members (out pot) (see Paradis, 2011; www.Chesl.ualberta.ca for more details on this measure).

Procedures

Trained Turkish-Persian speech-language pathologists administered ALDeQ in schools, pre-schools, and speech therapy clinics in Persian and Turkish if was needed. Regarding the lack of standard tests and clinical markers, two speech language pathologists (SLPs) as the gold standard for detecting language impairment in Turkish-Persian Bilingual children were used. SLPs were experienced clinicians and academic members. Language sample analyses were used informally in both of languages (Turkish and Persian) to diagnose LI and TLD. The questions were asked verbally from the parent (mostly mothers). Then the pathologist documented the response to questions using a rating scale and qualitative questions. ALDeQ was administered along with the Usage of Language Questionnaire, containing information on language usage. The usage of Language Questionnaire (ALEQ) was administered to calculate the age of exposure and duration of exposure to Persian; however, only ALDeQ scores were analysed in detail in this study.

Generally, higher score of ALDeQ would be more indicative of children with typical language development. In other words, a child with LI should obtain a lower ALDeQ score, while a child with TLD should obtain a higher score. According to the questionnaire developer, questions which parents do not or cannot respond to were replaced by the average score. The scores of each section and the total score of the questionnaire are proportional and range from 0 to 1. The calculation of proportional score allows for a better account of parents responses. For more information about scoring see Paradis et al. (2010).

In the present study, the parents answered almost all of the questions. So very few numbers of children had missing scores for more than one question or one section ($N < 10$).

Results

Statistical analyses were performed in SPSS18, STATA, and MEDCALC. The mean age of children in the TLD and LI groups was 74 months (S.D = 8 months) and 77 months (S.D = 15.2 months), respectively. A T-test on age, age of exposure to Persian, and months of exposure between the two groups were not significant (Table 1).

Distribution of the total scores of children in the two groups is shown in Figure 1.

The Cronbach alpha coefficient of the questionnaire, administered among the parents of 136 bilingual children (22 LI and 114 TLD), was 0.77, which is considered acceptable. Missing values, which were not answered by the parents, were replaced by the average score to increase the study reliability. The difference between the TLD and LI groups regarding the total score of the questionnaire was significant according to the results of independent t-test ($t(136) = 7.84$, $p < .01$, $d = 1.59$.TLD = .77 vs. LI = .57) (Table 2).

Differences were observed in all sections of the questionnaire within one standard deviation, as can be seen in Table 2. Also, Table 2 presents the mean and standard deviation of the

Table 2. Between-group comparison of ALDeQ-Persian total and section scores.

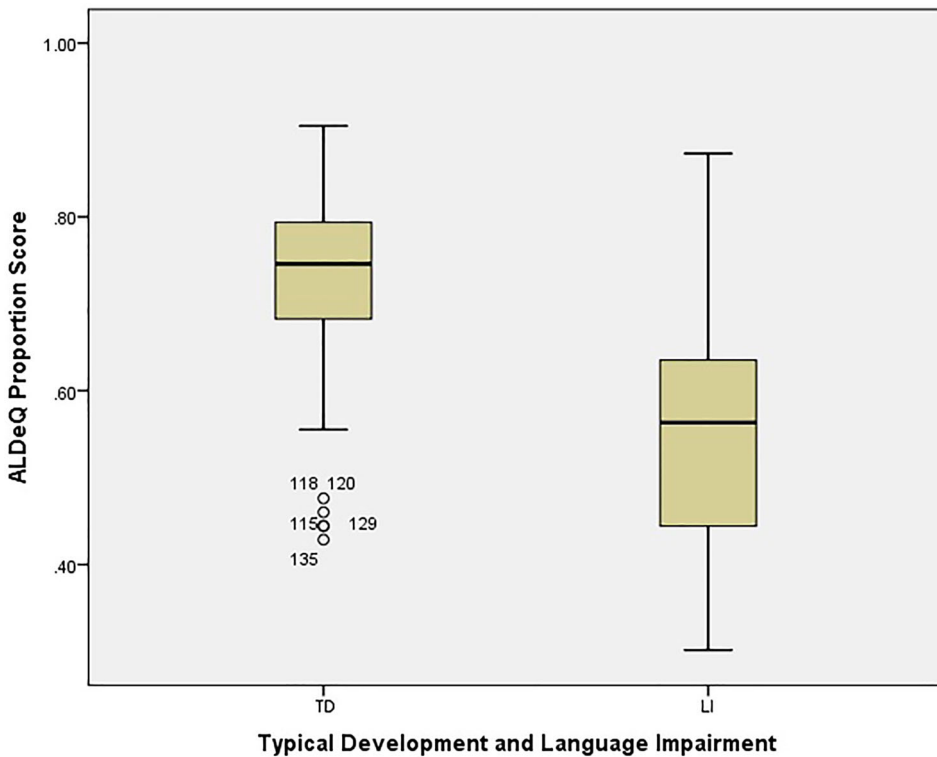| Section	TLD		LI		T	Df	P(two way)	Cohen's d
	Mean	SD	Mean	SD				
A = Early milestones	.93	.12	.69	.24	6.98	134	.001	1.26
B = current L1 abilities	.78	.18	.55	.17	5.43	30.76	.001	1.24
C = behaviour and activities	.78	.11	.66	.14	3.30	26.51	.001	.82
D = family history	.40	.37	.19	.33	2.63	31.69	.01	.59
Total score	.77	.10	.57	.14	7.84	134	.01	1.59

Figure 1. Box plots of ALDeQ-Persian total scores for the typically-developing and language-impaired groups.

questionnaire scores in the groups. A linear discriminant function analysis was conducted to categorize the groups: the results indicated the moderate to high predictive power of the questionnaire Table 3. The data show superior specificity to sensitivity 87.7% of TD children were correctly classified, but just 77.2% of LI children were correctly classified. The cross-validation results in Table 3 suggest that this group classification would be similar given a new sample (Table 3).

In addition, the linear discriminant function analysis of the total score of the questionnaire indicated its adequate predictive accuracy with acceptable sensitivity (0.80) and specificity (0.89). In other words, this questionnaire could accurately identify 89% of typical children and 80% of children with LI (Table 4) ($L = .68$, x^2 5 ($N = 136$) = 50.50, Can correlation = .56 $p < .001$).

Moreover, the linear discriminant function analysis of all sections of the questionnaire was performed separately and combined. As shown in Table 4, all models were significant; however, sections D and C had the lowest coefficients and contribution. Although section A showed the highest discriminating power, the A+B+C model was considered optimal regarding its high sensitivity and specificity. Table 4 presents the sensitivity and specificity of each section of the questionnaire, as well as the total score.

Table 3. Classification table from linear discriminant analysis for ALDeQ-Persian total scores.

		Predicted group membership		
		TLD	LI	Total
Original	TLD	100(87.72)	14(12.28)	114
	LI	5(22.73)	17(77.27)	22
Cross-validated	TLD	100(87.72)	14(12.28)	114
	LI	5(22.73)	17(77.27)	22

Table 4. Linear discrminant function analysis with ALDeQ-Persian section scores.

Models	Wilk's lambda	Canonical correlation	Standardized coefficient	CUT OFF ≤− 1.25 SD	Specificity	Sensitivity
Model A	$L = .73$, x^2 1, $(N = 136) = 41.45$, $p < .0001$	.51	-	.77	.88	.72
Model A + B	$L = .68$, x^2 2, $(N = 136) = 49.62$, $p < .0001$	.55	$A = .77$ $B = .45$	.80	.76	.74
Model A+B +C	$L = .67$, x^2 3, $(N = 136) = 53.14$, $p < .0001$	.57	$A = .72$ $B = .36$ $C = .29$	.76	.80	.90
Model A+B +C+D	$L = .65$, x^2 4, $(N = 136) = 55.40$, $p < .0001$	.58	$A = .67$ $B = .38$ $C = .26$ $D = .23$	.63	.80	.77
Total score	$L = .68$, x^2 5, $(N = 136) = 50.50$, $p < .0001$	.56	-	.69	.89	.80

Discussion

The aim of this study was to determine the discriminating validity of the Persian version of ALDeQ in sequential bilingual children. The participants included the parents of Turkish-Persian bilingual children with TDL and LI. The questionnaire consisted of 18 questions, which were divided into four parts: early milestones, current language abilities of the L1, behaviour patterns and activity preferences, and family history.

The ALDeQ-Persian cut-off score that is .69 in the one standard deviation $p < .0001$, it means if a child score is lower indicates the child's first language development profile is more consistent with children who have LI than children who have typical language development, but may suggest presence LI attrition, We recommend checking for signs of L1 attrition by comparing across the section scores, and reviewing the answer to question10b, to see if section B scores are the main source of a low ALDeQ total score, and adjust interpretation accordingly.

The present findings showed that there was a significant difference between the groups regarding the total score of the questionnaire, as well as the score of each section (sections A to D). These findings are consistent with the results reported by Paradis et al. (2010) and Bonifacci et al. (2016).

According to the present findings, the Persian version of ALDeQ was less specificity: 89%, but more sensitivity: 80% than the English version with sensitivity: 66%, specificity: 96% Paradis, Emmerzael, & Duncan (2010). On the other hand, the sensitivity and specificity of the Persian version of ALDeQ in the present study was lower than the Italian version (sensitivity: 83%, specificity: 93% in Bonifacci et al., 2016).

One reason for the lower sensitivity of Persian version of ALDeQ compared to its specificity may be that some children with LI being misidentified in this study. Actually, if measures and protocols already existed for the accurate identification of LI among Turkish-Persian bilingual children, there would be fewer reasons for this kind of researches. Future research with children whose L1 could be examined directly would be useful for determining whether sensitivity in this study was an artifact of the sample of children.

Other Finding of this study showed that, scores of section A had the highest discriminating power, followed by section B, section C, and section D, which had the lowest power, The results of this study are consistent with the findings reported by Paradis et al. (2010).

In the study by Paradis et al. (2010) scores of section A showed the highest discriminating power, followed by section B, section C, and section D, which had the lowest power.

In the study by Bonifacci et al. (2016), scores of section A had the highest discriminating power, while the scores of section D had the least discriminating power. The results of present study are consistent with the findings reported by Bonifacci et al. (2016). Moreover, in the study by Bonifacci et al. (2016), section A, followed by section C and section B, had the highest discriminating power.

However, in the study by Paradis, similar to the present study, the scores of section B had a higher discriminating power than section C. It can be concluded that the Persian version of ALDeQ has acceptable sensitivity and specificity for differentiation of bilingual children with LI from TLD.

The results of the present study showed that the score of sections A& B which is related to early milestones, plays a significant role in differentiating children with TLD from those with LI and have a larger effect size, compared to other sections of the questionnaire. Lower scores of these sections indicate that the child has potential LI. These findings support the notion that having poor competence in L1 might be a sign of language impairment (Erdos, Genesee, Savage, & Haigh, 2014).

Although sections C and D had lower effect sizes and predictive power in differentiation of children, integration of section C alongside sections A and B increased the sensitivity and specificity of the questionnaire. The lower scores of sections D and C could be attributed to the cultural barriers to disclosing information about relatives, recalling of family problems, and parents' feeling of shame to discuss language or literacy problems in the family could have co-occurred in this study and diminished the influence of this factor. Potential shame involved in admitting that a family member has language or literacy problems and many families might come from regions with economic hardship; therefore, tracing educational experiences and outcomes for family members is complicated and lack of school success might be entirely environmental in nature.

These factors can result in the parents' inappropriate responses, low responsiveness of parents, lower scores of these sections, and poor differentiation of children with LI. For example low score in section C may be due to question 13, that the result of majority of parent reporting that the main activity that children engaged it was watching television, and parent of children with LI knew their children were seeing SLPs this could influence their responses that make parent likely to rate overall satisfaction or comparison their children to other children lower or higher, furthermore if parent were aware that their child were was delayed in general, This caused inappropriate responsibility to the questions and may led to low scores in the C and D section. For control of the cultural barriers the parent were interviewed by Trained Turkish-Persian speech-language pathologists in Persian and Turkish.

Moreover, based on our findings, the children's scores of section B could differentiate children with respect to their current L1 Abilities, despite L1 attrition in the TLD and LI groups. Anderson (2004) discusses how L1 attrition characteristics complicate the bilingual assessment of children, including over-identification. Although parental reporting can generally help differentiate children with TLD from those with LI, individual profiles should be considered, as well. We recommend checking for signs of L1 attrition by comparing across the section scores, and reviewing the answer to question10b, to see if section B scores are the main source of a low ALDeQ total score, and adjust interpretation accordingly.

Conclusion

The aim of this study was to evaluate the discriminating power of the Persian version of ALDeQ in order to determine whether it can be used in the assessment battery of bilingual children. The present results showed that the Persian version could be a reliable tool for evaluating Turkish-Persian bilingual children. In order to accurately diagnose a child with LI, speech-language pathologists are recommended to combine the information of parental questionnaire with the objective evaluation of linguistic competence in both languages of children. The developed questionnaire can be applied by speech-language pathologists, physicians, and educators to identify LI in sequential bilingual children.

The present study had some limitations. First, it was conducted via convenience sampling in only several areas of Tehran; therefore, we should be cautious about generalizing the findings. Second, there was no available standard tool for detecting LI in bilingual children in the present study. However, this issue can be explained with respect to the objectives of the present study. Despite these limitations, this is the first study in Iran to evaluate the differentiation of typical Turkish-Persian bilingual children from those with LI. Also, the present results can improve the differential diagnosis of bilingual children with LI. It is suggested to conduct further research in other bilingual cities of Iran, with respect to their cultural and economic diversities, because Turkish-Persian bilingual

children shamed for speaking in Turkish in Tehran that Persian is common language, but in other bilingual city, which Turkish is common language they receive encouragement and support to speak in Turkish. It is also recommended to identify bilingual children with LI based on the clinical assessment of both languages.

Recommendation for clinical practice

This study showed that ALDeQ-Persian be appropriate discriminator of children with LI and TLD and ALDeQ could be a useful addition assessment battery for LI children from children with mean age of 74 months (1 standard deviation 60–102 months) and average of 18 months exposure to Persian in preschool or school(1 standard deviation 8–28 months). cautions requiring to attention in using the ALDeQ include, making sure the bilingual child being tested has the general characteristic of the children in the ALDeQ norming sample, If there is a possibility of attrition in the L1, a proper judgment is needed for the interpretation, and keeping in mind that the ALDeQ has more specificity to sensitivity when interpreting scores to identify purposes. The issue of ALDeQ application in other Iranian cultures and languages need to further research.

The Persian version of ALDeQ would be useful to SLPs for obtaining information on Turkish-Persian children' Turkish language development and could be used in conjunction with the other measures as dynamic assessment, non-word repetition test and analysing language sample in both language to identify LI children.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

Persian version of Alberta Language and Development Questionnaire

A. Primary milestones

1. When did your child start walking for the first time?	Before 15 months = 3 After 16 months: 0 **Score: /3**
2. At what age did your child say the first word? Examples of the child's first words (with translations):	Before 15 months (infant) = 6 At 16–24 months (toddler) = 3 After 25 months (two years or more) = 0 Score: 0–6 **Score: /6**

3. At what age did your child start making short sentences through putting words together?
  Short sentences = two words, example = 'More milk' 'More water' 'Give more'
  Examples of short sentences (with translations):
	Before 24 months (toddler) = 6
	At 25–30 months (Almost 2–2.5-year-old) = 4
	After 31 months (Almost 3-year-old or more) = 0
	Score: /6

4. Do you think that the time your child started talking was different from peers?
  If the family says my child is better or more advanced, score 3. Give a different score only if parents say their child is behind other children.
  3 = Not different at all; 2 = Slightly different; 1: quite different; 0 = Very different
	Score: /3

To calculate the subtotal for Section A, add the total possible score for all questions answered as the denominator. Then add the scores for the parent's responses as the numerator. If all questions were answered, the denominator would be: 18	**SUB TOTAL A** **/18**

B. Current first language abilities

•Compare the child with other Persian-learning children, except for question 10.

5. Compared with his/her peers, how does your child convey his/her intention? 0 = Not very well; 1 = Somewhat well; 2 = Similarly; 3 = Very well/Better/Among the bests	Score: /3
6. Compared with his/her peers, how does your child pronounce words? 0 = Not very clearly; 1 = Sometimes unclearly; 2 = Similarly; 3: Very clearly/Among the bests	Score: /3
7. Do your family members or friends easily speak with your child? 3 = Very easily; 2 = Easily enough; 1: Sometimes uneasily; 0 = No, Very difficultly	Score: /3
8. Compared with his/her peers, does your child have difficulty in speaking correct sentences? 3 = Without any difficulty, Perhaps better; 2 = Similarly; 1 = Some difficulties; 0 = Many difficulties	Score: /3
9. Are you satisfied with how your child speaks his/her mother language? 3 = Completely satisfied; 2 = Satisfied; 1 = Perhaps dissatisfied; 0 = Completely dissatisfied	Score: /3

10. Do you think your child speaks his/her mother language like his/her citizen children?
  0 = Not as good as citizens;
  1 = Sort of like citizens, with a slight difference;
  2 = Most of the times yes close to citizens;
  3 = Yes, better or just like citizens
	Score: /3

10.B. Why are you dissatisfied? Why do you think your child is different from his/her citizen children? Do you think he/she is missing his/her mother language for the Persian language?	
To calculate the subtotal for Section B, add the total possible score for all questions answered as the denominator. Then add the scores for the parent's responses as the numerator. If all questions were answered, the denominator would be: 18	**SUB TOTAL B** **/18**

C. Behavioural patterns and activity preference

11. Does your child like reading a book or having a book read to him/her? 0 = Never; 1 = Rarely; 2 = Sometimes; 3 = Very much	Score: /3
12. Compared with his/her peers, how does your child read and write (in mother language)? *If he/she is of tender age, read and write = numbers, alphabets/characters, and recognition of some words. If he/she has not been educated yet, omit this question.*	Score: /3

0 = Considerably worse than other children; 1 = Not as good as other children; 2 = Like other children; 3 = Very good, perhaps better

13. What kind of activities does your child like to do?
  3 = Verbal games (Example: reading, writing, playing school)
  2 = Cognitive games (Example: puzzles, painting, brain games, computer games, and cars)
  1 = Physical games (Example: football, baseball, swimming)
  0 = Other games (Examples: watching TV, video games, dress-up, or age-appropriate kid games)
	If parents select more than one category, divide sum of the scores by the number of the scores and then, round the result if necessary
	Score: /3

14. How easily and quickly does your child learn new things?
  Examples: exercise; words; games/puzzles; with new toys (learning the rules of group exercises such as football, LEGO games, and computer games)
  Examples of the child when learning new things:
  3 = The same day/Immediately; 2 = With a bit effort; 1 = Needs time and help for learning; 0 = Needs long time/Sometimes never learns
	Score: /3

15. What is your child's behavioural pattern? 3 = One activity at a time and completing it; 2 = One or two activities at a time and completing one; 1 = Two to four activities at a time and completing one; 0 = More than two/or many activities at a time and rarely completing one	Score: /3
16. Does your child feel frustrated when he/she cannot convey his/her intention? 3 = Never; 2 = Sometimes; 1: Often; 0: Many times	Score: /3
To calculate the subtotal for Section C, add the total possible score for all questions answered as the denominator. Then add the scores for the parent's responses as the numerator. If all questions were answered, the denominator would be: 18	**SUB TOTAL C /18**

D. Family history

17. A. Please tell us about your relatives. What education and employment do they have in your town? The aim of this question is to provide a base for interpreting the answers to question 17.B.	
17. B. Did all family members finish high school? If no, why?	3 = Yes; 0 = No Score 0.3 **Score: /3**
18. Is there anyone among the child's family members or other relatives with difficulties in learning, reading, writing, speaking, or pronunciation, or retardation in speech learning? Please explain.	Positive family history? 6 = Asymptomatic 3 = Yes, perhaps 0 = Yes, certainly Score 0.6 **Score: /6**
To calculate the subtotal for Section D, add the total possible score for all questions answered as the denominator. Then add the scores for the parent's responses as the numerator. If all questions were answered, the denominator would be: 9	SUB TOTAL D /9

***Calculating the ALDeQ Total Score*: Add all numerators and denominators from sections, and calculate a proportion between 0 and 1.0**
  Section A = / (18)
  Section B = / (18)
  Section C = / (18)
  Section D = / (9)
  Total = / = _____