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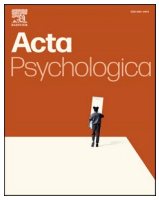

# Translation, psychometric evaluation, and network analysis of the parental acceptance and action questionnaire (PAAQ) among Arab parents of children with and without specific learning disability (dyslexia)

Norah Alkhateeb

*Department of Special Education, College of education, Qassim University, Saudi Arabia*

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ABSTRACT

*Objective:* The current study evaluated psychometric properties and network analysis of the Parental Acceptance and Action Questionnaire (PAAQ) among Arab parents of children with and without dyslexia.
*Method:* 419 parents of community sample children and 318 parents of children with dyslexia (CWD) completed the PAAQ, Interpersonal Mindfulness Scale (IMS), and a socio-demographic checklist. Exploratory Graph Analysis (EGA), Confirmatory Factor Analysis (CFA), and Exploratory Factor Analysis (EFA) were used to determine the factor structure of the PAAQ. Cronbach's alpha was used to estimate internal consistency. Finally, the centrality measures are derived from network theory (betweenness, closeness, and strength).
*Results:* In both community and CWD samples, the author identified similar factor structures encompassing three dimensions: proactive behavior and adaptability in parenting, acceptance of personal parenting-related inner experiences, and acceptance of the child's negative inner experiences. Item 18 was removed due to poor factor loading in both samples, resulting in a final version of the PAAQ with 18 items (instead of 19 items). This factor structure was revealed through EFA analysis and confirmed by CFA and GFA, demonstrating the scale's consistency. For all subscales in both samples, Cronbach's alpha was more significant than 0.7, indicating suitable internal consistency. Regarding centrality, both the community and dyslexia groups had similar centrality measures in some items. However, the dyslexia group generally showed higher betweenness values than the community group in several items (e.g., PAAQ.6, PAAQ.7).
*Conclusion:* The PAAQ is a suitable scale for use with Arabic parents, including community samples and parents of children with dyslexia.

## 1. Background

### 1.1. Children with dyslexia

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), dyslexia is classified as a specific learning disorder that falls under the category of neurodevelopmental disorders (American Psychiatric Association, 2013). Dyslexia is marked by difficulties recognizing letters, words, and sentences, misunderstanding text meanings, and poor reading comprehension. Studies have found that the prevalence of dyslexia among children worldwide ranges widely, from 3 % to over 27 % (Shaywitz et al., 2021; Sunil et al., 2023; Yang et al., 2022).

In the last two decades, various studies have shown that children with dyslexia experience a wide range of social and mental health problems. Also, these children are more prone to experience these problems (Giovagnoli et al., 2020). The comorbidity rates of neurodevelopmental disorders, attention deficit hyperactivity disorder, and developmental language disorder in these children are 40 %, 20–40 %, and 50–60 %, respectively (Brimo et al., 2021; Landerl & Moll, 2010; Snowling et al., 2020). For example, one study showed that >36 % and 25 % of children with dyslexia experience significant levels of depression and anxiety, respectively (Feng et al., 2024). Furthermore, about 33 % of these children experience clinical levels of Attention-deficit/hyperactivity disorder (ADHD) (DuPaul et al., 2013; McGrath & Stoodley, 2019).

Besides mental health issues, one study showed that stomach pain and headaches are widespread among children with dyslexia (Willcutt & Pennington, 2000). Additionally, a meta-analysis and systematic review revealed that children and adolescents with dyslexia demonstrated

*E-mail address:* no.alkhateeb@qu.edu.sa.

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significantly different performances across various motor tasks, and these differences remained evident even when the type of motor task was included as a moderator in the analysis (Decarli et al., 2024). Additionally, children with dyslexia may face stigma that impacts their mental health and academic performance, even if they have not been formally diagnosed (Feng et al., 2024). So, it is necessary to consider dyslexia as a serious and crucial public health issue.

### 1.2. Parents of children with dyslexia

Research on dyslexia has primarily concentrated on children with the condition, often neglecting the needs of their parents. Most existing studies have focused on supporting children, such as developing techniques specifically for them (Radtke et al., 2024; Salehinejad et al., 2022). However, supporting parents raising children with dyslexia is equally important and beneficial (Bonifacci et al., 2014). Additionally, parenting in these circumstances is inherently linked to various challenges. Parenting and educating a child with dyslexia can be pretty demanding. Research has found that parents of children with dyslexia tend to experience greater levels of parenting stress and symptoms of depression compared to parents of children without this condition (Antshel & Joseph, 2006; Bonifacci et al., 2014). Accordingly, parents of children with dyslexia often experience negative emotions upon receiving the diagnosis, including denial, frustration, guilt, and stress due to unfulfilled expectations of having a 'perfect' child (Venkatakrishnashastry & Vranda, 2012). Furthermore, about 95 % of mothers of dyslexic children experience anxiety about their child's future and academic performance, as well as distress related to dyslexia (Karande et al., 2009). There's even research that shows that parents find it increasingly difficult to support their children through the dyslexia diagnostic process (Bonifacci et al., 2014; Leitão et al., 2017). More specifically, mothers struggle with coping with teachers who don't want or care about their child's dyslexia (Bonifacci et al., 2014; Multhauf et al., 2016). This is a huge emotional burden they can feel when they deal with the assessment process which can affect their child's self-esteem and learning. The solutions for these problems include better channels of communication between parents and educators, and training parents on advocacy, and support services such as counseling (Senarath, 2021).

### 1.3. Parenting in dyslexia: Role of experiential avoidance and flexibility

One of the most important predictors of children's learning, health, and overall adjustment is parents' quality of life. Parents with healthy levels of physical and mental health can provide supportive situations, positive interpersonal relationships, and practical guidance to their children that are necessary for their child's development process. But, parenting with considerable levels of mental and physical health is the main reason for children mental health and developmental impairments (Laugesen & Groenkjaer, 2015). The parent-child relationship is particularly complex, characterized by a unique, bidirectional dynamic in which both the parent and the child influence each other's behavior, emotions, and overall well-being (Laugesen & Groenkjaer, 2015).

Parenting itself involves stressors, but research shows that families with children who have chronic mental or physical conditions experience a significantly higher level of persistent stress compared to other families (Bonifacci et al., 2019; Laugesen & Groenkjaer, 2015). The demands of managing such conditions can lead to what is often termed "chronic caregiving stress," where parents face both the day-to-day challenges of caregiving and the emotional strain associated with their child's ongoing health issues. These parents often encounter additional burdens, including increased medical appointments, social stigmatization, and concerns about the child's future, which can contribute to sustained emotional and psychological strain.

Recent studies suggest that parents in these challenging caregiving roles frequently rely on experiential avoidance as a coping mechanism (Cheron et al., 2009a, 2009b). Experiential avoidance involves attempts to escape or avoid unpleasant internal experiences, such as distressing emotions, thoughts, or bodily sensations. This form of avoidance can become problematic when parents feel "trapped" in repetitive efforts to control or evade these experiences rather than address them openly (Chawla & Ostafin, 2007; Hayes et al., 1996). In situations that require flexible, adaptive parenting responses, these parents may instead exhibit psychological inflexibility—a tendency to rigidly respond to stress without adjusting to the situation (Moyer & Sandoz, 2015).

The behavior patterns associated with experiential avoidance are often reinforced through negative reinforcement. When a parent successfully avoids or escapes an uncomfortable emotion or situation, it can provide temporary relief, encouraging the repetition of avoidance behaviors in future situations. This cycle can perpetuate a sense of entrapment in avoidance-based coping strategies, which, although immediately relieving, may undermine long-term parental effectiveness and emotional health (Chapman et al., 2006).

An equally important variable in children's mental health is parent-child attachment. Parent-child attachment is a bidirectional relationship. In fact, parents and children shape each other's actions, moods, and well-being (Laugesen & Groenkjaer, 2015).

Stressors can exist in the process of parenting but, for example, if a child has a chronic mental or physical illness, the family experiences far more chronic stress than is typical for any other families (Bonifacci et al., 2019; Laugesen & Groenkjaer, 2015). These conditions could be an example of "chronic caregiving stress." Parents are dealing with the daily pressures of caring for their children.

They are also facing the emotional pressures of managing their child's chronic health conditions. These parents carry additional responsibilities. They have more appointments at the medical staff offices and hospitals. Also, they face social stigma and questions about their child's future. These challenges can create long-term emotional and psychological stress.

Recent research has found that parents often cope with these hard parenting roles through experiential avoidance (Cheron et al., 2009a, 2009b). Experiential avoidance attempts to avoid, or at least escape, negative internal feelings (bad feelings, thoughts, physical sensations). This avoidance can be problematic. Parents may become "locked" in the same cycle. They might try to manage or avoid these experiences instead of facing them directly (Chawla & Ostafin, 2007; Hayes et al., 1996). In this context, where flexible parenting is required, these parents can become psychologically rigid. They may impose a stress response rather than remain sensitive to the circumstances (Moyer & Sandoz, 2015).

The behavioral circuitry that plays a role in experiential avoidance tends to be negatively reinforced. When a parent avoids a painful feeling or situation, the temporary relief can be rewarding and increase the possibility of future avoidance. This creates a loop that perpetuates a cycle of self-entrapment in avoidance-based coping. While this pattern could provide short-term satisfaction, it can affect the parent's long-term mental health (Chapman et al., 2006).

On the other hand, psychological flexibility is considered a "fundamental aspect of health," contradictory with experimental avoidance. Current research suggests that parental psychological flexibility may moderate the relationship between parent and child distress, which is mentioned above and is associated with healthy parenting behaviors (Davoudi et al., 2022; Rajaeiramsheh et al., 2021).

In parenting, experiential avoidance and psychological inflexibility are characterized by an inability to confront the child's own experiences and/or to implement the parental action that is needed when they occur (Rajaeiramsheh et al., 2021). It refers to the ability to handle negative internal experiences flexibly while concentrating on the parent-child relationship and sustaining effective parenting practices (Burke & Moore, 2015).

Accordingly, it is essential to address psychological inflexibility in various parenting groups for the well-being of families, necessitating valid and reliable instruments for this purpose. According to this

conclusion, Holmberg Bergman et al. (2024) demonstrated that the PAAQ is a robust tool for measuring parental psychological inflexibility, with good construct validity, adequate internal consistency, and high reliability over time. The study, conducted on three Swedish samples including a clinical group of treatment-seeking parents of children with disabilities, highlighted that the PAAQ successfully discriminates between parents with high psychological inflexibility and those in the general community. Furthermore, parents of children with disabilities, including conditions such as ADHD, autism, and other developmental challenges, exhibited significantly higher levels of psychological inflexibility compared to parents in the community sample. While the clinical sample comprised a mix of diagnoses, the findings remain robust, underscoring the importance of context-specific tools like the PAAQ in identifying and addressing parental distress effectively.

### 1.4. Parental acceptance measurement: A new perspective

The Acceptance and Action Questionnaire (AAQ-I) and its updated version (AAQ-II) are the most widely utilized scales for psychological flexibility assessment (Bond et al., 2011; Fledderus et al., 2012). The AAQ-I was developed to measure experiential avoidance, while the AAQ-II related to psychological inflexibility. Besides the promising results of using these scales in clinical and educational settings, they have faced some limitations. First, the AAQ-I has low internal consistency, and the AAQ-II showed weak discriminant validity (Barrett et al., 2019; Fledderus et al., 2012; McAndrews et al., 2019). In studies based on acceptance and commitment therapy (ACT) for parents of children with disabilities, the AAQ-II or similar scales (originated from the AAQ) have predominantly been used as outcome measures (Gur & Reich, 2023). It has been noted that context-specific adaptations of the original AAQ, including domain-specific questions, show improved incremental and discriminant validity and are more sensitive to the specific domain of interest than general psychological flexibility measures. The Parental Acceptance and Action Questionnaire (PAAQ) is a relevant scale tailored for parents. The PAAQ is developed according to theories behind the "acceptance and action" concept. Previous research indicates that the PAAQ is both practical and psychometrically valid for use with parents of children facing a variety of issues (Bergman et al., 2024; Cheron et al., 2009a, 2009b; OKAJIMA & Okajima, 2022). Nevertheless, further research is necessary to validate these context-specific tools across diverse settings and research frameworks (Ong et al., 2019).

### 1.5. The current study aims

Arabic letters are categorized based on basic shapes, such as (ب- ت- ث) or (ج – ح – خ), and are distinguished by the number and placement of dots. Additionally, the form of each letter can change depending on its position within a word (Aboras et al., 2012). So, dyslexia could be a major problem in children in Saudi Arabia and recently gained considerable research interest. Especially a new study has shown that >6 % of Saudi students in grades 3–6 are diagnosed with dyslexia, which is higher than the dyslexia level in many countries (Aldakhil et al., 2023).

However, most existing research has focused on community samples rather than clinical ones, and to our knowledge, no studies have validated these instruments in the context of parenting a child with dyslexia. Furthermore, the scale does not seem to have been translated into Arabic, even for the general population.

The primary objective of this study was to evaluate the psychometric properties of a 19-item Arabic version of the Parental Acceptance and Action Questionnaire (PAAQ) specifically designed for both the general population and parents of children with dyslexia.

This research intended to contribute significantly to the existing literature by addressing several key aims:

#### 1.5.1. Cultural adaptation

To adjust PAAQ for Arabic speakers with cultural adaption and accuracy. This included translating the questionnaire and setting the items to account for the parenting issues and experiences of dyslexic parents in Arabic-speaking countries.

#### 1.5.2. Psychometric analysis

To validate the Arabic version of the PAAQ with some level of regularity among parents of dyslexic children. It entailed checking for construct validity, convergence, discriminant validity, and internal consistency to ensure the scale matched the experience and challenges of this demographic.

#### 1.5.3. Comparison of groups

To compare the psychometric properties of the PAAQ between parents of children with dyslexia and the general population. This allowed for any special tendencies or needs that might have been present in this group, and this could be matched with specific support and interventions.

## 2. Method

### 2.1. Study design

The current study was a cross-sectional study conducted in Saudi Arabia from April 2024 to July 2024. It includes two independent populations: a community sample (parents) and parents of dyslexic children. The clinical and demographic descriptions of both samples are presented in the result section.

### 2.2. Participants and procedure

A web-based survey was developed for the community sample. The web-based survey advertisement presented information about the study's aims and procedures. The inclusion criteria presented in the advertisement were (a) have at least one child; (b) none of their children have a mental or physical health condition that needs to meet physicians, take medicine, or take part in psychological sessions; (c) being a volunteer to take part in the current study and (d) having no mental or physical chronic conditions. They responded to a web-based survey that included the Arabic versions of the PAAQ, a short form of the interpersonal mindfulness scale (IMS), and a section that included sociodemographic and clinical questions (presented in the results section). For parents of children with dyslexia, several steps were conducted. First, an advertisement was developed for teachers about dyslexia and the process of dyslexia diagnosis.

They took part in a free educational session on introducing dyslexia, its risk factors, and the primary diagnosis of this disorder. In the second step, they were asked to nominate students with consistent problems in Arabic reading writing. Third, a team of educational and clinical psychologists excluded children with attention-deficit hyperactivity disorder, visual impairments, hearing impairments, and Borderline intellectual functioning, which were assessed by the Wechsler Intelligence Scale IV (WISC-IV), and those with chronic physical conditions. Fourth, the remaining children were evaluated by DSM.5 criteria for learning disorder (here, dyslexia). Finally, parents of children who received dyslexia were invited to take part in our study. They responded to the Arabic versions of the PAAQ, the short form of the interpersonal mindfulness scale (IMS), and a section that included socio-demographic and clinical questions.

### 2.3. Sample size determination

According to the "*bootnet*" (Epskamp & Fried, 2015) and "*MASS*" (Ripley et al., 2013) R packages, we have found that a sample size of 300 is suitable. Furthermore, previous notable studies recommended larger samples (at least 300–500) for stable edge weight and centrality estimates, especially when using bootstrapping to evaluate stability

(Epskamp et al., 2018). Therefore, we consider a threshold of 300 to 500 as an ample sample size for each group.

### 2.4. Translation and cross-cultural adaption

In order to translate the process of the PAAQ, we followed APA guidelines and some novel studies that translated psychological scales into Middle Eastern countries (Alotaibi, 2024; Azadi et al., 2024; Davoudi et al., 2023).

#### 2.4.1. Forward translation

In the initial step, two native Arabic speakers, both holding PhDs in psychology and fluent in English, translated the original version of the PAAQ into Arabic, resulting in PAAQ V.1.

#### 2.4.2. Backward translation

PAAQ V.1, which was in Arabic, was translated back into English in a backward translation process. This was conducted by two researchers, producing PAAQ V.2.

#### 2.4.3. Expert committee

An expert committee, including the researchers from the previous phases and the authors of the current study, compared PAAQ V.1 with PAAQ V.2. Based on their evaluations, they generated PAAQ V.3.

#### 2.4.4. Pilot testing

The pilot testing phase involved administering the preliminary Arabic version of the Perceived Adult Attachment Questionnaire (PAAQ V.3) to 15 native Arabic-speaking participants from various Middle Eastern backgrounds. Participants were asked to complete the scale and provide feedback on unclear, challenging, or culturally incongruent items. This phase aimed to identify any linguistic biases and cultural mismatches and to check the understandability of items for the general population with different levels of literacy. Finally, we revised the scale according to the received feedback.

The expert panel took notes on the responses and fine-tuned them for clarity and cultural fit. They distilled complicated terms, did not talk much like academics, and chiselled out phrases that were incomprehensible in Arabic. In the case of items involving abstract ideas, the committee had translated for psychological accuracy but in easily understood terms, resulting in the final Arabic edition of the PAAQ. This final version maintained the accuracy of the original instrument and was thought comprehensible and culturally acceptable to Arabic-speaking people.

### 2.5. Measures

#### 2.5.1. Socio-demographic-clinical checklist

An author-made checklist that included age, gender, salary range, parents' education levels, and other factors such as marital status, number of children in the family, and parents' occupations was developed to evaluate the sociodemographic variables.

The short form of the ***Interpersonal Mindfulness Scale (IMS-SF-13)*** was developed by Pratscher et al. (2022). This scale assesses interpersonal mindfulness across four subscales: presence, awareness of self and others, non-judgmental acceptance, and non-reactivity (Pratscher et al., 2022). The measure was on a five-point Likert scale ranging from 1 (almost never) to 5 (almost always). Scores range from 13 to 65, and higher scores indicate higher levels of interpersonal mindfulness. The results showed that the Arabic version of this scale has suitable psychometric properties (Fekih-Romdhane et al., 2024).

The ***Parental Acceptance and Action Questionnaire (PAAQ)*** is a 19-item scale that has been adapted into several languages, including Swedish and English Cheron et al., 2009a, 2009b; Holmberg Bergman et al., 2024). Items rated on a scale from 1 (never true) to 7 (always true). The main aim of the current study was to translate the PAAQ and evaluate its psychometric properties. Higher scores indicate higher levels of acceptance and psychological flexibility among parents.

### 2.6. Analytical plan

All data analyses were conducted using R Studio software (version 4.2.1). First, missing data were addressed through listwise deletion, which led to varying degrees of freedom based on the sample sizes.

Second, for the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), the author created two subsamples from each dataset, including both community and clinical samples. The EFA was performed on these subsamples using the "EFAtools" R package (Steiner & Grieder, 2020). The data's adequacy was evaluated using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. A KMO value above 0.70 and a statistically significant Bartlett's test indicate sufficient adequacy. Promax oblique rotation and principal component analysis were utilized for the exploratory factor analysis (EFA). Rather than predetermining the number of factors, factors with eigenvalues greater than one were retained. Factor loadings exceeding 0.30 were considered significant. It was expected that each item would load predominantly on its corresponding factor. Loadings $<0.30$ across all factors or exceeding 0.30 on unrelated factors suggest poor model fit. (Shrestha, 2021).

Next, confirmatory factor analysis (CFA) in the second subsample was performed. This process assessed construct validity following the exploratory factor analysis (EFA) findings. Model fit adequacy was assessed using several indices: standardized root means square residual (SRMR), goodness-of-fit index (GFI), chi-square to degrees of freedom ratio ($\chi 2/df$), comparative fit index (CFI), and root mean square error of approximation (RMSEA). A model fit was considered satisfactory if it met the criteria of GFI and CFI above 0.9, RMSEA below 0.08, $\chi 2/df$ below 3, and SRMR below 0.10 (Brown & Moore, 2012; Kordbagheri, Abdelrahman, et al., 2024; Thompson, 2004).

Additionally, the Exploratory Graph Analysis (EGA) that used the "EGAnet" package in R Studio (Golino et al., 2020) was used. Initially, the author performed a redundancy analysis to detect local dependencies, particularly focusing on items with high correlations influenced by wording effects. In contrast to traditional factor models, which assume that questionnaire items measure a common latent variable, network models consider items as causally independent (Christensen et al., 2023). Detecting redundancies, such as local dependencies, is essential because they can adversely affect dimensional estimation and need to be resolved before performing Exploratory Graph Analysis (EGA). Following this, a network was created using the Graphical Least Absolute Shrinkage and Selection Operator (GLASSO) method (Moriana et al., 2022). The GLASSO method generates a regularized partial correlation matrix, which is interpreted as a Gaussian Graphical Model. In this model, nodes represent items, and edges show partial correlations between item pairs. To detect clusters of highly correlated items, the EGA employed a walktrap algorithm (Golino & Epskamp, 2017). Acknowledging the potential impact of sampling variability on EGA results, the author adhered to the recommendations of Christensen and Golino (2021) by assessing the reliability of the findings through non-parametric bootstrapping. This process included performing 1000 iterations in the current study.

To assess internal consistency, the "psych" package in R was employed (Revelle & Revelle, 2015). This package provides tools for calculating Cronbach's alpha. To assess test-retest reliability, the author examined measurement consistency over time by administering the same test or measure to the same group of participants on two separate occasions. Test-retest reliability — We calculated the Intraclass Correlation Coefficient (ICC) to measure test-retest consistency two times (Kordbagheri, Kordbagheri, et al., 2024). In addition, centrality measures showed major nodes. Measures of centrality are standard metrics for judging the relative value of a unit in terms of structural significance, status, prestige or visibility. Various centrality measures are sensitive to relationships between a focal unit and other units. Our study focused on

three standard centrality measures widely used in behavioral sciences: Betweenness, Closeness, and Strength. These metrics evaluate node importance within a graph and capture diverse aspects of a node's connections to others. Please refer to (Bringmann et al., 2019; Abdelrahman et al., 2024; Davoudi et al., 2024; Yan & Ding, 2009; Azarmehr et al., 2024) for a deeper understanding of centrality.

## 3. Results

### 3.1. Clinical and socio-demographic variables

The primary samples examined included a community sample comprising 419 participants and a sample of parents of dyslexic children comprising 318 participants. Table 1 presents the demographic and clinical variables and compares two independent samples. The children's ages were similar between the groups (community: 9.98 ± 1.48; dyslexia: 9.84 ± 1.42; $p > 0.05$). Parents of dyslexic children were older on average (36.92 ± 8.32 vs. 35.30 ± 7.17; $p < 0.05$). The gender distribution of children did not significantly differ, but there was a significant difference in parents' gender (more males in the community sample). Educational attainment varied significantly, with fewer parents of dyslexic children holding a diploma or higher education. No significant difference was found in PAAQ total scores, but parents of dyslexic children had lower IMS total scores.

### 3.2. Exploratory factor analysis (EFA)

For the community sample, the Kaiser-Meyer-Olkin (KMO) sampling adequacy index, which measures data suitability for exploratory factor analysis, returned a value of 0.75. This indicates good sample adequacy, as KMO values between 0.7 and 0.8 are considered good (Hill, 2011). Additionally, Bartlett's Sphericity Test, which assesses sphericity, yielded a statistical result of 716.25 with a significance level of $P < 0.001$, confirming the dataset's appropriateness for factor analysis. We found a three-factor structure, which is presented in Table 2. Moreover, item 18 has been removed because of low factor loadings. Fig. 1 supplementary presented the component number of the scree plot.

For parents of dyslexic children, the Kaiser-Meyer-Olkin (KMO) sampling adequacy index, which measures data suitability for exploratory factor analysis, returned a value of 0.70. This indicates good sample adequacy, as KMO values between 0.7 and 0.8 are considered good (Mathur, 2022). Additionally, Bartlett's Sphericity Test, which assesses sphericity, yielded a statistical result of 565.75 with a significance level of $P < 0.001$, confirming the dataset's appropriateness for factor analysis. We found a three-factor structure, which is presented in Table 3. Moreover, item 18 has been removed because of low factor loadings. Fig. 2 supplementary presented the component number of the screen plot.

### 3.3. Confirmatory factor analysis (CFA)

In the CFA, an initial model with three factors was developed. The fit indices for the adjusted model indicated a good and satisfactory fit for the three-factor structure within the Arabic community sample and parents of children with dyslexia (see Table 4). Furthermore, all factor loadings for the items on their respective factors exceeded 0.3 and were statistically significant ($P < 0.001$) (refer to Table 2 and Table 4, Fig. 1, and Fig. 2). Furthermore, a second-order confirmatory factor analysis model was used to evaluate the PAAQ in both samples. The fit indices indicated that the second-order structure of the PAAQ demonstrated a favorable and satisfactory fit within the Arabic context (refer to Table 4). This characterization of fit suggests that the model accurately represents the underlying relationships among the variables as intended. Specifically, all factor loadings for the five components of the PAAQ framework were >0.4 and statistically significant, indicating strong associations between the items and their respective factors. In addition, the chi-square statistic ($\chi^2$) values, alongside their degrees of freedom (df) and associated $p$-values, revealed that the model had a good fit to the data, with $\chi^2$/df ratios of 1.13 for the community sample and 1.03 for the dyslexia sample, both of which fall below the threshold of 2, suggesting a well-fitting model. Furthermore, Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) of >0.95 indicate that this model explains much more variance than the baseline model. The SRMR (Standardized Root Mean Square Residual) below 0.08, as well as the RMSEA (Root Mean Square Error of Approximation) below 0.06, are further evidence that good fit has been determined. Collectively, these indices provide robust evidence that the PAAQ's second-order structure is well-suited for the Arabic context, reflecting its validity and reliability for assessing parental acceptance and action in relation to their child's experiences with dyslexia.

### 3.4. Exploratory graph analysis (EGA)

EGA estimated a three-dimensional structure of the PAAQ for both samples (Fig. 2, Fig. 3). For both samples, the one dimension includes PAAQ.9, PAAQ.15, PAAQ.4, PAAQ.11, PAAQ.5, PAAQ.7 and PAAQ.8. Also, the other dimensions showed similar structures in both samples. These results showed that the PAAQ factor dimensions are similar in both samples.

### 3.5. Centrality measures

We used centrality measures to identify the most critical nodes in the community and dyslexia samples, employing the NCT function to compare their network structures. The Network Invariance Test ($M = 0.1566974$, $p = 0.72$) and the Global Strength Invariance Test ($S = 0.2583607$, $p = 0.54$) indicated no significant differences between the two networks, suggesting similar structural properties and overall connectivity. Fig. 4 presented the centrality measures graphically, while Supplementary Tables 1 and 2 detailed the numeric metrics of centrality

**Table 1**
The background, demographic, and clinical information of the participants.

| Variables | | Community parent sample ($n = 419$) | Parents of dyslexic children (318) | Test statistics |
|---|---|---|---|---|
| Children age | | 9.98 ± 1.48 | 9.84 ± 1.42 | $t = 1.27$, $p > 0.05$ |
| Parents age | | 35.30 ± 7.17 | 36.92 ± 8.32 | $t = - -2.88$ $p < 0.05$ |
| Children gender | Male | 213 (50.83 %) | 167 (52.51 %) | Chi-Square = 0.141, $p > 0.05$ |
| | female | 205 (49.17 %) | 152(47.48 %) | |
| Parents gender | Male | 216 (51.55 %) | 142 (44.34 %) | Chi-Square = 3.71, $p < 0.05$ |
| | female | 202 (48.44 %) | 177(55.66 %) | |
| Parents education | Under high school | 148(35.33 %) | 156(49.05 %) | Chi-Square = 13.86, $p < 0.05$ |
| | Diploma | 147(35.08 %) | 93(29.24 %) | |
| | B.SC or higher | 123 (29.35 %) | 70 (22.01 %) | |
| PAAQ total score | | 70.78 ± 12.11 | 69.60 ± 12.80 | $t = 1.28$, $p > 0.05$ |
| IMS total score | | 32.85 ± 10.17 | 30.12 ± 9.11 | $t = 3.77$, $p < 0.05$ |

**Table 2**
Results of the factor structure of the PAAQ for the community sample.

| Items | Internal consistency for all sample (α) | EFA (Sample 1, $n = 209$) | | |
|---|---|---|---|---|
| | | Factor loading | h2 | Eigenvalue (%variance explained) |
| **Factor 1: Acceptance of own way parenting-related inner experiences** | | | | |
| 2. When I am feeling depressed or anxious, I find it difficult to assist my child in handling their fears, worries, or emotions. | 0.724 | 0.69 | 0.50 | 3.21 (16.93 %) |
| 3. I attempt to avoid unpleasant thoughts and feelings about my child by not thinking about them. | | 0.65 | 0.42 | |
| 14. Worries can hinder my child's success. | | 0.67 | 0.45 | |
| 17. I frequently daydream about past activities with my child and consider how I might approach them differently in the future. | | 0.70 | 0.50 | |
| 19. When I compare myself to other parents, most of them handle their lives more effectively than I do. | | 0.64 | 0.43 | |
| 6. I must clear all my doubts before my child can undertake something important. | | 0.57 | 0.35 | |
| ***Factor 2*: acceptance of the child's negative inner experiences** | | | | |
| 5. I seldom worry about managing my child's anxieties, worries, and feelings. | 0.719 | 0.64 | 0.44 | 2.43 (12.79 %) |
| 8. I make a strong effort to prevent my child from feeling depressed or anxious. (reversed) | | 0.63 | 0.41 | |
| 9. It's not good if my child feels anxious. (reversed) | | 0.62 | 0.39 | |
| 15. My child should act based on their feelings at the moment. | | 0.63 | 0.40 | |
| 4. It's acceptable for my child to feel depressed or anxious. | | 0.53 | 0.29 | |
| 11. If I could magically erase all the painful experiences my child has had, I would. | | 0.58 | 0.37 | |
| 7. I'm not intimidated by my child's emotions. | | 0.56 | 0.33 | |
| ***Factor 3*: Action-taking and flexibility in the parenting context** | | | | |
| 1. I can address my child's fears, worries, and feelings even when I'm unsure of the best approach. | 0.706 | 0.73 | 0.56 | 2.08 (10.97 %) |
| 10. Despite my doubts, I can create a plan to manage my child's feelings. | | 0.75 | 0.56 | |
| 16. If I promise to do something with my child, I'll follow through even if I don't feel like it later. | | 0.64 | 0.42 | |
| 12. I can control the events in my child's life. | | 0.69 | 0.48 | |
| 13. Despite feeling frustrated with my child, I am still able to support them. | | 0.55 | 0.32 | |

h2: communities

measures (betweenness, closeness, strength) for all nodes in the community and dyslexia samples, respectively. According to these tables and Fig. 4, the most important node in the community sample is PAAQ.7, exhibiting the highest values in-betweenness (2.709824788), closeness (2.122055774), and strength (1.154422929). In contrast, the most central node in the dyslexia sample is PAAQ.15, with betweenness (3.095259122), closeness (2.106153044), and strength (1.438315458) being the highest among the nodes. Despite these differences in central nodes, the overall analysis shows no significant differences in the structure or global strength of the networks between the two groups, highlighting similar network characteristics with different key nodes in each sample.

### 3.6. Validity

The scale's content validity was supported by content validity index (CVI) values above 0.82 and content validity ratio (CVR) values >0.79, confirming strong alignment with the intended constructs. Additionally, all impact scores exceeded 1.5, indicating that each item was relevant and retained, thereby supporting the face validity of the scale. The association between the PAAQ and IMS yielded a Pearson correlation of 0.116 ($p < 0.05$). While this correlation is statistically significant, its low value suggests a weak association between the two measures, providing limited support for convergent validity. This result implies that while some degree of convergent relationship exists between the PAAQ and IMS, the strength of the association does not constitute robust evidence of convergent validity.

### 3.7. Test-Re-test reliability

As presented in Table 2 and Table 3, Cronbach's alpha in both samples was higher than 0.7 in all subclasses, which means this scale has suitable internal consistency. To assess test-retest reliability, we randomly selected 34 participants and administered the survey again after two weeks. The results showed that the intra-test reliability was 0.79.

## 4. Discussion

The current study aimed to assess the psychometric properties of the Arabic version of the PAAQ. This scale is designed to measure parental psychological inflexibility and experiential avoidance. Such models are especially important when interpreting how parents cope with uncomfortable inner experiences about their child's behavior, emotions, or developmental needs, such as those caused by neurodevelopmental issues such as dyslexia. This study evaluated the Arabic version of the PAAQ to ensure that it is culturally and contextually relevant to Arabic-speaking parents. Thus, it offers this population a robust index of parenting-related psychological flexibility and avoidance.

In this work, the Arabic PAAQ showed good psychometric properties of reliability, validity, and consistency in Saudi Arabian samples. The scale, in particular, had high internal consistency, structural validity, and reliability scores. These findings indicate that it can be used to measure parental psychological flexibility and experiential avoidance among Arabic-speaking parents.

The analysis used different samples to confirm that the tool was

**Table 3**
Results of the factor structure of the PAAQ for the parent of children with dyslexia.

| Items | Internal consistency for all sample (α) | EFA (Sample 1, $n = 159$) | | |
|---|---|---|---|---|
| | | Factor loading | h2 | Eigenvalue (%variance explained) |
| **Factor 1: Acceptance of own way parenting-related inner experiences** | | | | |
| 2. When I am feeling depressed or anxious, I find it difficult to assist my child in handling their fears, worries, or emotions. | 0.704 | 0.67 | 0.47 | 2.70 (14.21 %) |
| 3. I attempt to avoid unpleasant thoughts and feelings about my child by not thinking about them. | | 0.56 | 0.34 | |
| 14. Worries can hinder my child's success. | | 0.61 | 0.39 | |
| 17. I frequently daydream about past activities with my child and consider how I might approach them differently in the future. | | 0.60 | 0.39 | |
| 19. When I compare myself to other parents, most of them handle their lives more effectively than I do. | | 0.67 | 0.46 | |
| 6. I must clear all my doubts before my child can undertake something important. | | 0.63 | 0.40 | |
| **Factor 2: acceptance of the child's negative inner experiences** | | | | |
| 5. I seldom worry about managing my child's anxieties, worries, and feelings. | 0.734 | 0.54 | 0.32 | 2.60 (13.70 %) |
| 8. I make a strong effort to prevent my child from feeling depressed or anxious. (reversed) | | 0.58 | 0.40 | |
| 9. It's not good if my child feels anxious. (reversed) | | 0.51 | 0.33 | |
| 15. My child should act based on their feelings at the moment. | | 0.65 | 0.43 | |
| 4. It's acceptable for my child to feel depressed or anxious. | | 0.61 | 0.38 | |
| 11. If I could magically erase all the painful experiences my child has had, I would. | | 0.62 | 0.39 | |
| 7. I'm not intimidated by my child's emotions. | | 0.53 | 0.30 | |
| **Factor 3: Action-taking and flexibility in the parenting context** | | | | |
| 1. I can address my child's fears, worries, and feelings even when I'm unsure of the best approach. | 0.711 | 0.67 | 0.47 | 2.39 (12.36 %) |
| 10. Despite my doubts, I can create a plan to manage my child's feelings. | | 0.65 | 0.51 | |
| 16. If I promise to do something with my child, I'll follow through even if I don't feel like it later. | | 0.78 | 0.62 | |
| 12. I can control the events in my child's life. | | 0.66 | 0.44 | |
| 13. Despite feeling frustrated with my child, I am still able to support them. | | 0.58 | 0.35 | |

h2: communities

working: a population sample of parents in the general population and clinical samples of parents of dyslexic children. This multi-sample study enabled exhaustive testing of the scale's generalizability to various parenting contexts. So, the results were broadly valid and applicable in Saudi Arabia. These results are presented and reported in the remaining portions of the paper – in the scale factor structure, validity indices, and centrality measures in general and clinical samples (Okajima & Okajima, 2023).

In another study, the findings found that parental psychological inflexibility– especially when marked by experiential avoidance – is a leading predictor of long-term parental stress and psychological suffering. This mentioned paper measured the psychometric properties of the original 19-item PAAQ in three Swedish samples: a community sample, a clinical sample of treatment-seeking parents of children with disabilities, and a test-retest sample (337). Principal Axis Factoring – A 16-item, three-factor model was derived from the community sample: (1) action-taking and flexibility in the parenting context; (2) experiential acceptance of inner experience about parenting; and (3) experiential acceptance of internal experience about the child. This factor arrangement was also confirmed by confirmatory factor analysis on the test-retest sample (Holmberg Bergman et al., 2024).

The Arabic version of the PAAQ, like other translations/versions of the PAAQ, showed strong reliability and validity indicators, showing that it was beneficial for assessing parental psychological in/flexibility and avoidance. This conformity with other studies (including a recent one of the Swedish PAAQ) underpins the scale's validity for various populations. In the Swedish version, for example, there was a 16-item, three-factor system measuring (1) action-taking and parenting flexibility, (2) experiential acceptance of parenting inner experiences, and (3) experiential acceptance of the child's inner experiences. It was a design confirmed in multiple samples, such as a community sample and a clinical sample of parents of children with disabilities, confirming the tool's flexibility and utility (Holmberg Bergman et al., 2024).

However, culture can influence the retention of items and factor designs. In this case, for the Arabic-speaking sample, the best fit was an 18-item version. This small tweak demonstrated the extent to which cultural and linguistic variances can influence the psychological scale design and how the individual objects work even when the overall structure remains the same. These variations mean that the PAAQ conceptual base might hold for everyone but that particular items might need to be reworked to be culturally and contextually appropriate. This study, then, also illustrated that the PAAQ can be used to reliably measure different parenting groups, including those who find themselves coping with the specific difficulties associated with parenting children with developmental delays like dyslexia.

Second, EFA and CFA were used to confirm the structure of the scale, latent factors, and fit to the model. EFA and CFA of the PAAQ in both samples indicated a three-dimensional construct (a) of parenting-related inner experiences, (b) of the child's inner experiences, and (c) of parental action and adaptability. Comparing the PAAQ factor models in the community sample with the parents of dyslexic children revealed several differences. In the community sample, participants generally showed higher factor loadings and communalities on Factors 1 (Acceptance of Own Parenting-related Inner Experiences) and 3 (Action-

**Table 4**
Confirmatory factor analysis models of the PAAQ.

| sample | CFA | χ2 | df | p | χ2/Df | tli | cfi | srmr | gfi | ifi | rmsea |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Community sample | Second order | 149.174 | 132 | 0.146 | 1.13 | 0.961 | 0.967 | 0.058 | 0.931 | 0.968 | 0.025 |
| Dyslexia sample | | 136.251 | 132 | 0.382 | 1.03 | 0.989 | 0.990 | 0.061 | 0.915 | 0.991 | 0.014 |

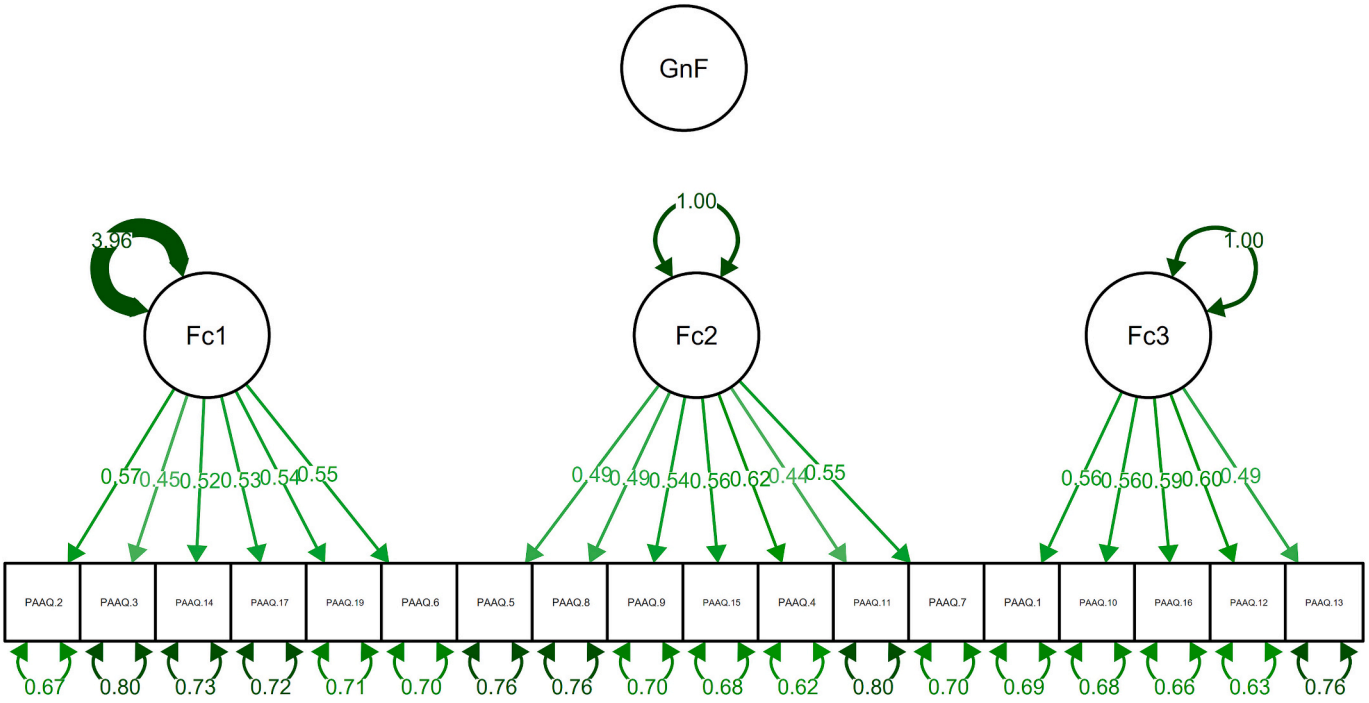


**Fig. 1.** Confirmatory Factor Analysis plot for community samples.

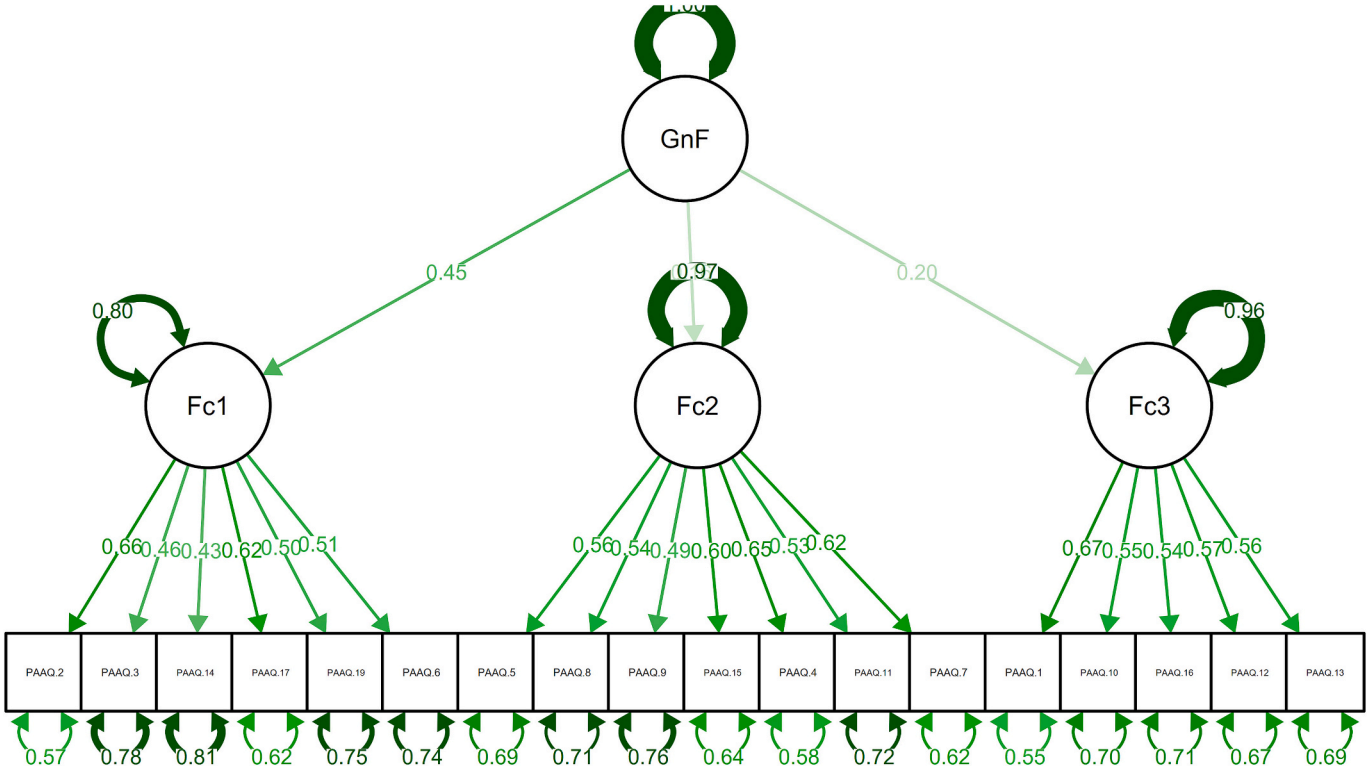


**Fig. 2.** Confirmatory Factor Analysis plot for clinical samples.

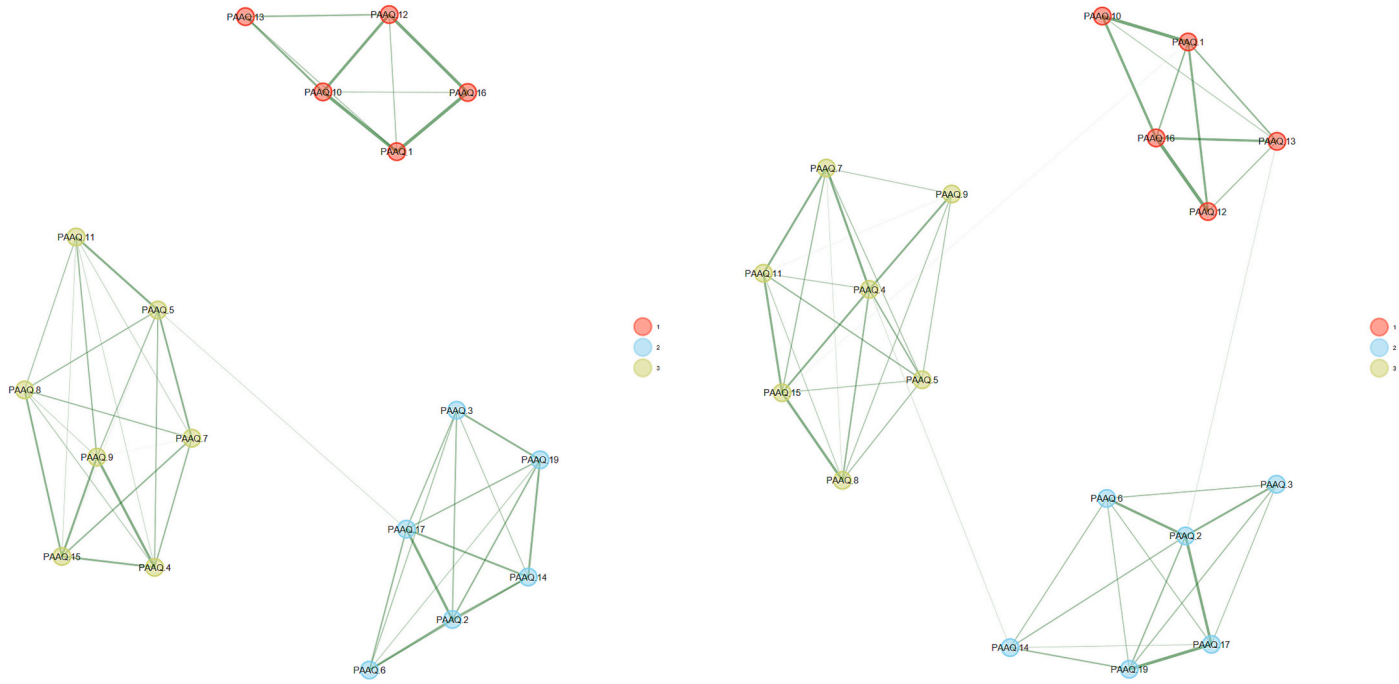


**Fig. 3.** Dimensionality Results for EGA in a community sample (left side) and for parents of children with dyslexia (right side). Note: The LASSO algorithm was used to estimate the EGA structure.

taking and Flexibility in the Parenting Context). This indicated a stronger relationship between these items and their respective factors within this group. Items like "If I am depressed or anxious, I find it difficult to support my child with fears, worries or feelings" (Item 2) and "I did not feel very confident in coming up with a plan to support my child's feelings" (Item 10) had significantly higher factor loadings and communalities in the community sample, suggesting more substantial match with the factor constructs.

The parents of dyslexic children, on the other hand, had more factor loadings for some items in Factor 2 (Acceptance of Child's Negative Inner Experiences) and Factor 3. For instance, Item 16, "If I promised to do something with my child, I'd do it even if I later didn't feel like it," was more loaded in the dyslexia sample (again, showing a more active focus on action-taking). What's more, items related to the kid's acceptance of feelings (ie, item 4: "It's okay if my kid feels sad or stressed") were also loading higher in the dyslexia sample, which might indicate a different importance or meaning for those concepts than the community sample.

These loadings of factors and communalities varied but the relative proportion of variance explained by each factor was similar in both samples, with only slight differences. It meant that although items and factors' relationships were stronger in both sets of respondents, the main factor structure of the PAAQ was identical between the groups. In general, the community sample was more strongly correlated with Factors 1 and 3, while the dyslexia sample displayed a more subtle relationship with Factors 2 and 3 especially action-taking and embracing negative experiences. So, to compare these findings with other studies, we reviewed two parallel studies.

The first study, conducted among parents of children with and without disabilities in Sweden, revealed a factor structure closely aligned with our findings, featuring identical items and factors (Holmberg Bergman et al., 2024). In contrast, the second study, which applied the PAAQ to parents of children with anxiety disorders, identified a two-factor model comprising (1) Inaction and (2) Unwillingness (Cheron et al., 2009a, 2009b). Notably, both studies, including ours, removed Item 18 due to its poor factor loading. This item, which states, "When I assess something my child did in a negative light, I typically understand that it is merely a reaction rather than an objective fact," appears to be unsuitable for use across different samples and cultures.

As a novel approach, they employed a network perspective to offer a fresh view of the PAAQ in both samples. Unlike EFA and CFA, which rely on statistical models to infer factors, EGA uses community detection algorithms to identify clusters of closely related items directly from the data (Golino & Epskamp, 2017). According to our results, EGA, CFA, and EFA all yielded similar factor structures, indicating strong consistency and robustness in the factor model. As this study was the first to use EGA with the PAAQ, it is impossible to compare the results with those of previous studies.

In comparing the centrality measures for the PAAQ items between the community and dyslexia samples, several notable differences emerged. In terms of betweenness, PAAQ.15 (My child should act based on their feelings at the moment) was significantly more central in the dyslexia sample (3.0953) compared to the community sample (−0.2463), indicating it plays a crucial connecting role in the dyslexia network. PAAQ.1 (When I feel depressed or anxious, I struggle to help my child manage their fears, worries, or feelings) also had higher betweenness in the dyslexia sample (1.6728) than in the community sample (1.2317). For closeness, PAAQ.15 was again more central in the dyslexia sample (2.1062) compared to the community sample (−0.7252), suggesting it is more directly connected to other nodes in the dyslexia network. PAAQ.1 also showed higher closeness in the dyslexia sample (1.4245) versus the community sample (0.9605). Regarding strength, PAAQ.15 exhibited greater strength in the dyslexia sample (1.4383) than in the community sample (−0.8046), reflecting its stronger influence in the dyslexia network. Conversely, PAAQ.7 (I'm not intimidated by my child's emotions) showed lower centrality across all measures in the dyslexia sample compared to the community sample, indicating it has less impact in the dyslexia network. These differences suggest that the way parents in the dyslexia sample engage with items related to action and emotional acceptance (PAAQ.15) contrasts with the community sample, highlighting a more nuanced or intensified focus on these aspects within the dyslexia context.

Finally, Cronbach's alpha values were 0.7 for all subscales in the community and dyslexia samples, indicating acceptable internal consistency across the scales. This level of reliability suggests that the items

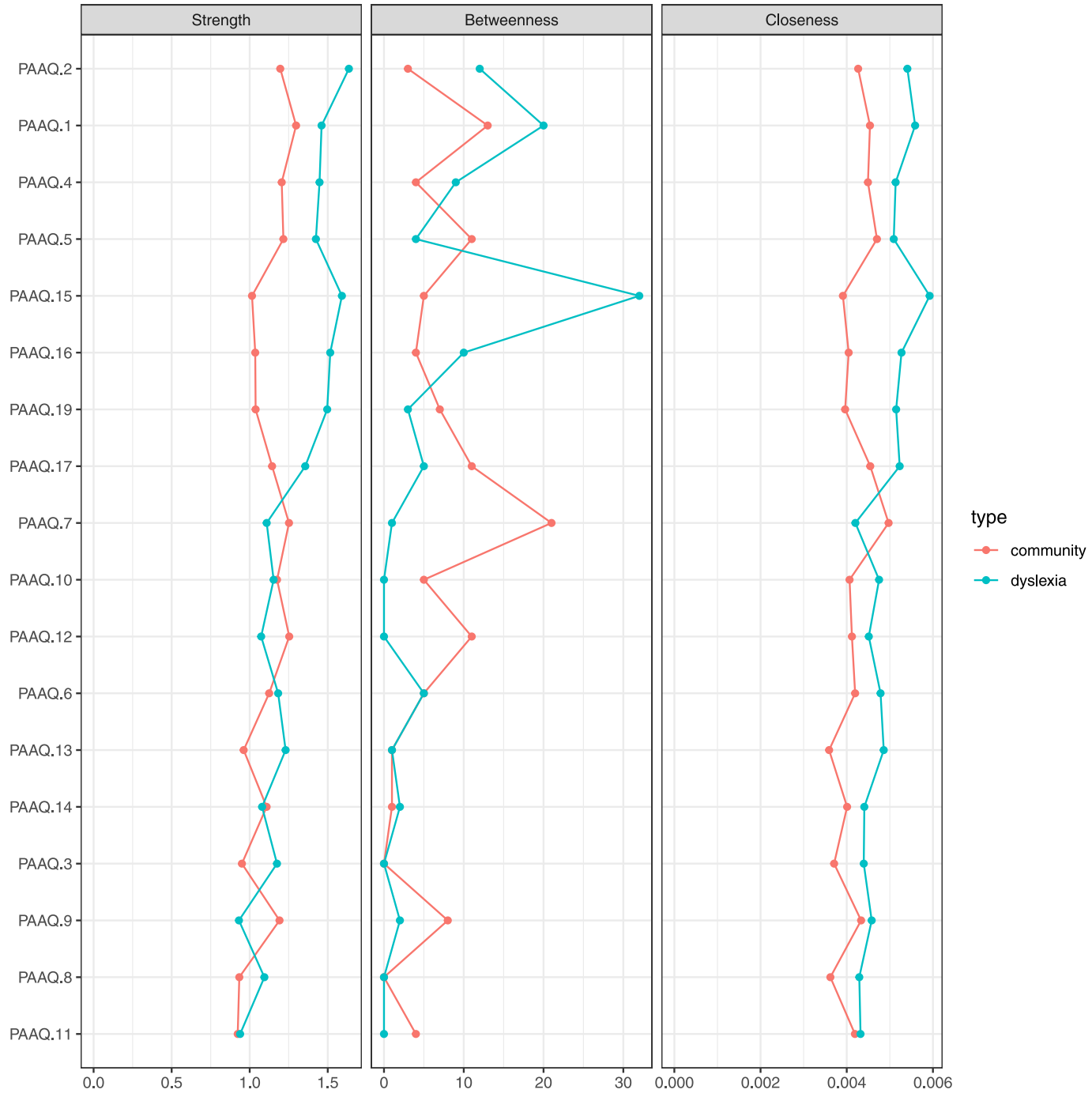


**Fig. 4.** Centrality measures for both samples.

within each subscale consistently measure the same underlying construct.

Yet, although a Cronbach's alpha of 0.7 is fine, values closer to 0.8 and beyond are often preferred for internal consistency reasons (Bujang et al., 2018; Tavakol & Dennick, 2011). The fact that alpha values were constant in both samples suggests that the PAAQ has stable measurement behavior. But even moderate reliability hints at the possibility of improvement in the scale's internal consistency (Bernardi, 1994; Vaske et al., 2017).

### 4.1. Limitations and future directions

For all the information this study offers, some caveats exist. While the sample size allowed the analyses, it might not have reflected Arab parents in general or those from socio-economic, regional, and educational categories in particular. It is this limitation that can lead to the conclusion that the results do not hold up for all members of the population. Future studies should consider including a more varied group to ensure the results are more generalizable – for example, by recruiting people from different socio-economic and cultural areas of the Arab world.

Second, the research was based on self-reports, which can be subject to social desirability bias. Participants might have answered the questions in ways that they thought were socially positive rather than entirely truthful, especially for questions about sensitive topics like parenting and mindful living. In future research, using a mixed-methods

approach (e.g., qualitative interviews or observational data) may give us a more nuanced and complete picture of parental tolerance and response. Researchers could learn more about parents' experiences, struggles, and beliefs by supplementing self-report data with observational evidence.

Third, while network analysis was uniquely able to capture relational relationships between items on the PAAQ, it was a relatively new approach in this respect and needs confirmation. Network analysis, particularly in psychology, is complicated, and these results should be taken with a grain of salt. It would be wise for future research to repeat these results using other statistical methods like structural equation modeling or multilevel modeling to provide additional support to the validity and robustness of network analysis results.

What's more, although the research used the IMS to measure mindfulness constructs, it only used one to measure convergent and divergent validity. While the IMS did have some value to offer on mindfulness in interpersonal relationships, any additional measures—especially if they evaluated related constructs like psychological flexibility, distress tolerance, or other dimensions of acceptance—would increase validation depth. This kind of analysis would have been better supported with additional external scales confirming both convergent and divergent validity, which should give further strength to the PAAQ findings.

Finally, Arab-specific cultural factors can affect how the PAAQ items are received and understood by parents. Parenting beliefs, attitudes, and practices are all deeply culturally based and may affect responses to constructs like acceptance, flexibility, and experience avoidance. Therefore, cross-cultural validation research is needed to ensure that the PAAQ tests for the expected constructs across cultures. Those kinds of research would ensure that the PAAQ is appropriately modified and tested for all cultures and could become a more valid tool for measuring parenting across cultures.

## 5. Conclusion

In conclusion, this study improves our knowledge about the psychometrics and network organization of the PAAQ among Arab parents of children with and without dyslexia. Results show that the PAAQ provides a valid and reliable measure of parental acceptability and intervention in this population. Network analysis also showed that specific items were significantly less important in community and dyslexia samples, indicating different forces in how dyslexic parents deal with them. It highlights the importance of psychological adaptability and experiential embrace in parenting – even when things do not go as smoothly as it does with a child who has dyslexia. If the insights can help identify areas of intervention, these results can be used to develop specialized support interventions to enhance parental well-being and, in turn, improve the adjustment and quality of life for both parents and children.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.actpsy.2025.104693.

## CRediT authorship contribution statement

**Norah Alkhateeb:** Writing – review & editing, Writing – original draft.

## Author contributions

N.A was responsible for all the writing of the article and data collection.

## Ethical consideration

The Qassim University Ethics Committee (24–08-08) approved the current study procedures. Written informed consent was achieved from all participants before the research procedures were operated. In addition, we informed them that they could leave the project whenever they wanted without any consequences. All methods were carried out following relevant guidelines and regulations or the declaration of Helsinki.

## Declaration of competing interest

The author declare no conflict of interest.

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## Data availability

The corresponding author will provide the datasets used and/or analyzed during the current work upon reasonable request.

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