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Design and validation of a scale for the assessment of educational competencies in traditional musical games

Carmen Fernández Amat[1], Francisco Javier Zarza-Alzugaray[1 ✉] & Luis del Barrio Aranda[1]

This work studies the traditional musical game as a didactic resource in the development of educational competencies in primary school students. The purpose of the study is to validate a scale for the evaluation of essential educational factors in the work of intrinsic competencies in traditional musical games. With a mixed design, the study involves a qualitative approach to the review and discussion of the contributions of social psychology theories: contact theory, cultural values theory, and attitude theory as well as a quantitative approach using an exploratory factor analysis, a parallel analysis and a confirmatory factor analysis of the use of traditional musical games in a sample of 276 primary school students. From an initial questionnaire of 30 items, a final questionnaire of 18 items was obtained, grouped into 4 subscales (Right to Play/Fun and Preferences/Choice of Game Partners/Emotion and Inclusion) derived from the theories of social psychology. The results demonstrate the need for effective tools to measure the educational value of traditional games. This scale could serve as a tool to contribute to the educational research on traditional musical games. Finally, the educational implications that the adoption of traditional games in the classroom can have in terms of integration, equal inclusion, and the social, physical, emotional, and cognitive development of primary school students are discussed.

[1] University of Zaragoza, Zaragoza, Spain. ✉email: fjzarza@unizar.es

Introduction

This study examines the relevance of traditional musical games (TMG) for the development of competencies of primary school students, with the ultimate goal of assessing general implications in the field of education.

In the first place, the right a child has to play establishes the game as an appropriate activity for their age, and traditional game as that involves them in life and cultural context. Although we now tend to regard children's right to play as indisputable, child protection and rights were not a subject of concern until the first third of the 20th century (Dávila and Naya, 2006). The first reference to children's right to play did not appear until 1959 in the DRC (United Nations, 1959). It was also stated in the UN Convention on the Rights of the Child (United Nations, 1989). Although the latter is an international treaty with binding obligations for all member states (Hodgkin and Newell, 2007), the right to play "was given less consideration than other rights within the same Convention" (Mallol, 2019, p. 41).

In 2013, the updated version of the UN Convention on the Rights of the Child highlighted the benefits of playing, not only for children's health and well-being but also for their integral development. Playing encourages creativity, imagination, and self-confidence. It not only reinforces a child's strength; it also improves their physical, social, cognitive, and emotional aptitudes while making a significant contribution to all aspects of learning. Playing cannot be considered a luxury (Fronczek, 2009) or a right that only needs to be obtained once all other rights have been ensured. On the contrary, playing is an essential, integral component of the life of the child (Lester and Russell, 2010). It reinforces the four principles of the Convention on the Rights of the Child: non-discrimination, survival/development, guaranteeing the child's best interests, and guaranteeing child participation (Meire, 2007).

In the second place, and within the play context, musical games are a learning activity governed by implicit rules that dovetail with the music's structure while offering children a series of occasions to explore, improvise, and express themselves (Barrett, 2016). A child's preference for a particular musical game can be motivated by its characteristics. Traditional games linked to songs or short rhymes reinforce memory, diction, and rhythmic adaptation, thereby making them one of the most important educational elements (Zamora, 2003). According to Parlebas (2009, p. 86), "In these sung games, the relational vector precludes any sort of competition or scoring: there is no winner […]. By adapting their motor behavior to collective requirements, players acquire a powerful sense of belonging to the group". Corporal and musical elements are jointly addressed in a group context, thus encouraging the development of motor abilities (Conde, 1997) while reinforcing individual independence as well as each member's sense of belonging. Such games featuring songs engender collective well-being while contributing to the child's overall development and their relationship with the world around them. The rhythmic experience shared in conjunction with the song provides a sense of balance and order, encouraging the development of motor capacities, including running, walking, and jumping, all of which are indispensable in the practice of games (María and Vilar, 2013). Musical games incorporate musical elements through singing, the creation and interpretation of rhythms, simple dances, or choreographies that accompany and encourage the child's participation in the playful activity.

Musical games incorporate "songs" through which they acquire an essential role in the construction of musical, social, ethnic, and cultural identity. Musical games transmit belief systems, ideologies, and intrinsic values that children have been learning since early childhood in all contexts where they have been involved, such as home, school, and the community (Young and Ilari, 2012). Certain studies have shown that children prefer games that include songs, as they allow them to enjoy and express emotions and ideas, giving rise to a sense of unity by synchronizing their voices and body movements with those of others (Ilari and Cho, 2023). The act of singing and dancing along with peers in playful activities can become a positive expressive resource that satisfies children's desire to share emotions, experiences, and activities (Kirschner and Tomasello, 2010). Disposition, choreography, and arrangements in traditional musical games can also convey a series of educational values that can play a role in how they are selected. Chorus games are a powerful tool for improving student behavior in the development of social skills, learning respect for differences, and instilling positive values (Curry, 1997). This implies the participation and attention of all students, a measure that contributes to the development of self-esteem in group experiences (Glazzard, 2016).

Song texts are accompanied by dramatizations that involve knowledge of the body and its expressive potential. Each child's expressive potential is enriched by the challenge of synchronizing the interpretation of a song with actions such as jumping, dancing, and doing percussion, and of accompanying the music with a series of gestures, pantomimes, and dramatizations. At the same time, children are given an occasion to share their cultural values with peers involved in the same game. When the initial musical recognition of a song leads them to feel an emotion contained in its story, this can significantly reinforce their mnemonic capacity and their social-cultural identity (Torremocha, 2004).

The collective character of traditional musical games contributes to the growth of interpersonal relationships. Thus, when traditional musical games are featured in school, they allow classmates to get to know themselves better while encouraging the participation of every class member. TMGs teach them to learn to manage their relationships with their classmates and improve harmonious coexistence, thereby exerting a positive impact on group cohesion (Andueza and Lavega, 2017). Playing with a classmate involves several modes of learning which the teacher should know how to identify: communicative learning that implies a mutual relationship, complementary learning in which one classmate helps another, coexistent learning when classmates are "pulling on the same rope," and cooperative learning when they react to one another's actions and feelings (Hinz, 1993). The teacher should be able to identify the three types of relationships or *dyads* that can exist or emerge among classmates: acceptance/choice, rejection, and indifference (Parlebas, 1992).

In the third place, through play, the child communicates and relates with others while remaining active and healthy (Bareiro, 2017; Winnicott, 2005). A child's preference for one game over another can be determined by a diverse series of factors, including enjoyment, a sensation of self-confidence, and, consequently, building trust in others, all of which encourage a child's personal development and self-knowledge.

Although examples of good practice can often be observed, it would be important for the right to play to be encouraged through a greater amount of explicit legislation and targeted policies providing schools and teachers with the necessary means to put it into practice (Mallol, 2019; Payà and Bantulà, 2021).

Certain studies have shown that the feeling of reciprocal acceptance in choosing game partners provides the child with a greater sense of security in the development of their personality. It encourages mutual respect and stimulates motivation to learn while protecting against stress (Jalón and Seoane, 2011). When students are allowed to choose their game partners freely, they tend to select those with whom they share common traits associated with gender, cultural markers, or the degree of competence in the activity (García-Bacete, 2006). The choice of a partner in

terms of affinity for the game tends to be associated with the performance of cooperative tasks. Such "dyads" thus encourage cooperation and mutual assistance among children (Slavin, 1999), provided that the proper cooperative conditions are given: positive interdependence, simultaneous interaction, equal participation, individual/group responsibility in learning together, and group self-evaluation, all oriented toward achieving a common goal. According to García et al. (2009), fun, friendliness, and friendship are the most frequent reasons that determine the choice of game partners, with significant differences between boys and girls. Fun and the degree of competence in the activity are the two primary motives of preference in boys. In contrast, friendliness and friendship are the motives that most often lead girls to prefer a particular game partner to another.

Finally, this aspect is associated with emotions and attitudes toward playmates such as inclusion, equal opportunity, and the acceptance of different capacities (Íñiguez-Santiago et al., 2017). Any social relation presupposes a certain degree of empathy as an indispensable component that involves an affective response to what we perceive from another individual (Brodbeck and Silani, 2013). Interacting with others, the game player acts and represents him/herself according to context and according to emotions he/she feels, provoking a series of responses in his/her counterparts (Lavega-Burgués et al. 2023). Also, cooperative games improve attitudes toward others while fostering respect for the varying capacities they might have (Mansilla and Abellán, 2022). In this sense, Parlebas (2009) specifies that positive attitudes displayed in games (including traditional musical games) foment relational well-being thanks to the division of labor, the sharing of emotions, and an individual's capacity to adapt to several potential situations within the game. This game-inspired sense of well-being allows children to place their game-playing capacity in the service of their peers. They feel assisted and supported by their team; this, in turn, gives rise to situations that generate relational affectivity. Moreover, certain games "function as pedagogical tools or 'affordances' that encourage the development of pro-social behavior" (González-Grandón et al., 2021, p. 234). In summary, learning experiences in game-playing environments favor the child's socio-emotional development.

The general area of equal opportunity and inclusion is associated with two vast subjects: gender and divergent capacities. Gender differences in emotional response "depend on the nature of the emotional stimulus, the context, and the response format" (Fiorentini, 2013, p. 15); moreover, emotional gender-related patterns can even be explained as a result of socialization. It nevertheless seems that emotional re-evaluation can lead to a positive sense of well-being and belonging in society (Fiorentini, 2013). Cooperative games can be based on gender differences. Lavega-Burgués et al. (2013, p. 9) affirm that "emotionality in women is much more akin to cooperative logic than the emotions displayed by men"; in non-competitive games, men achieve lower emotional scores. At any rate, games tend to offer considerable degrees of freedom to try out different roles and modes of presenting oneself (Kaufman et al., 2019); this has exciting repercussions in the educational field. In the area of inclusion and the acceptance of different capacities, games can serve as a tool that encourages mutual acceptance among people with and without disabilities; moreover, games can have social benefits (Vignes et al., 2008). In intellectually challenged people, cooperative games can produce behavioral changes that encourage participation, motivation, and respect for rules and norms (Carballal and González, 2020).

Once the qualities of TMGs that favor the much-needed emotional, social, and cultural well-being in educational contexts are known, it is necessary to assess the competence contributions of TMGs to primary school students.

Theoretical framework for the development of a scale designed to measure competencies associated with TMGs. When we analyze the context of this study, there are situations and evidence of previous works. Any motor practice of a game that a player has engaged in implies an emotional experience with a high educational value (Niubò-Solé et al., 2022). In 2018, the team of Lavega-Burgués already published the Games and Emotions Validation Scale (GES-II) for the study of emotional motor experiences (Lavega-Burgués et al., 2018). Similarly, instruments have been designed for the study of emotional experiences in school students who participated in games or sports, (Alcaráz-Muñóz, et al, 2022). On the other hand, Bossaert and Petry (2013) validated the CATCH scale by Rosenbaum et al. (1986). It is a self-report scale to assess the validity and reliability of children's attitudes in games. This scale was further validated by March-Llanes et al. (2023) to be applied to young and adult populations. However, all of the above questionnaires are circumscribed in the physical education environment, ignoring questions related to the processes of music education through traditional Games and Sports.

As a theoretical framework for designing the scale used in our study, the principles expounded in the psychological and social theories of Allport (1954), Schwartz (1994), and Triandis (1988) are reflected in the attitudinal, social, and cultural dimensions of TMGs (traditional musical games), as well as in the benefits and learnings derived from playing them.

TMGs are a collective experience that places an individual in contact with their peers in an encounter that is helpful in the construction of a personal identity and a group identity. The collective, social, and cultural nature of TMGs recalls the ideas expounded in Allport's intergroup contact hypothesis (Allport, 1954), further developed in Pettigrew & Tropp's intergroup contact theory (Pettigrew, 1998, 2021a; Pettigrew and Tropp, 2008, 2011). Those two theories purport that conflicts among individuals can be managed by maximizing personal contact with the aim of minimizing prejudice, understood as an "aversive or hostile attitude toward a person who belongs to a group, simply because he belongs to that group, and is therefore presumed to have the objectionable qualities ascribed to that group" (Allport, 1954, p. 9). The interactive characteristics of TMGs allow the individual to enter into contact with their peers, thereby reducing the amount of existent relational prejudice (Zuma, 2014) as they gradually gain a better understanding of the other person (McKay, 2018). The intergroup contact theory posits the following conditions for encouraging contact: *equal group status within the situation, common goals, intergroup cooperation*, and *authority support* (i.e., the acceptance of social norms). All these factors play a significant role in TMGs.

The usefulness of TMGs can also be explained by the principles that underpin Schwartz's (1994) social psychological theory of cultural values. Schwartz's theory explores differences among value priorities and their impact on attitudes and behavior; culture plays an essential role as a variable that can be measured and estimated as a set of meanings, beliefs, practices, symbols, norms, and values (Schwartz, 2006). Based on the study of cultural values, Schwartz's theoretical model propounds the following hypothesis: To solve social issues while preserving the individual's autonomy within the group, encouraging responsible behavior, guaranteeing social cohesion, and fomenting the adequate use of human and natural resources, it is necessary to promote the cultural values of *intellectual autonomy, emotional autonomy, membership in a group, egalitarian commitment, hierarchy, harmony*, and *mastery*. Once again, all these dimensions are closely associated with TMGs.

As a third underpinning for our theoretical framework, we also include Triandis's Triadic Model of Attitude (Triandis, 1974),

which defines an attitude as "an idea charged with emotion which predisposes a class of actions to a particular class of social situations or contexts" (Triandis, 1974, p. 3). The three types of components in Triandis's attitude model, i.e., cognitive (idea), affective (an associated emotion), and behavioral (predisposition to action), are of great interest in the context of TMGs.

Goal and methodology
Research goal. This study aims to validate a scale to assess the educational relevance of traditional musical games through the social and emotional interpersonal relationships they build and the characteristics that make them eligible as development factors of educational competencies in primary school.

Methodology
Qualitative approximation
An evaluation scale of the integration of Traditional Musical Games in primary education: In education, it is essential to consider the specific contexts in which the teaching-learning process takes place (Day and Gu, 2015). Potential research variables are thus numerous, including those related to educational policies or curriculum design. In Spain, we do not have any specific scale for the assessment of socio-educational competencies related to traditional musical games. The adaptation of a scale from another country to the Spanish context would not be the best option because Spain has specific national and regional school curriculum requirements while suffering from a pronounced lack of teachers specialized in this area. Our objective was therefore to design and validate a scale to fill the existing gap regarding traditional musical games (TMGs) in primary education.

The material we used consisted of a questionnaire designed ad hoc for this study. Apart from a battery of questions directly related to traditional musical games, the tool also foresaw a series of questions concerning participants' age, sex, and academic year.

Based on the study of the aforementioned theories, through a process of theoretical triangulation, we see how four fundamental categories emerge which are common to all researchers, and which form the theoretical basis to be empirically tested with the consequent statistical analyses proposed in the study. In our intent to design a Scale of Evaluation of Educational Competencies for Traditional Musical Games, we implemented an initial qualitative step by postulating four emergent research categories resulting from the theoretical framework expounded above:

Q1 Are TMGs recognized as a universal right of children in school?

Q2 What characteristics determine children's preference for a certain TMG?

Q3 Which criteria do children follow in choosing their game partners?

Q4 Can any relationships be discerned between TMGs and the emotional dimension?

As a further qualitative step, we grouped all research issues arising from the theoretical framework into four categories. After this categorical approximation, we formulated 4–5 questions closely associated with the categories we had created. We then proceeded to a qualitative refinement of the scale. The usual method employed to validate a scale involves asking a panel of experts to judge and evaluate each of the items proposed in a scale (Zarza-Alzugaray et al., 2016). In this phase, we sent redacted items, along with a description of their relationships with the posited categories, to three Spanish specialists ($n = 3$) in the field of traditional games, asking them to evaluate our items and categories in terms of comprehensibility, appropriateness, and plausibility. Their opinions and advice allowed us to clarify

certain aspects of language use and the subdivision of certain questions that were found to be too ambiguous. In several cases, we adjusted the formulation of certain items to make them more congruent with their category of reference.

After the qualitative refinement of the scale, we chose the tool's exact format, as well as the method we considered most adequate to measure responses (a Likert-type, 7-point scale, "as they provide a more accurate measure of a participant's true evaluation" Finstad, 2010, p. 104; Taherdoost, 2019; Russo et al., 2021).

Thereafter, we established a series of initial items, foreseeing that their number would substantially decrease after subjecting the tool to an initial statistical validation process. In such cases, it is recommended to formulate three or four questions per issue/subject (Mazas et al., 2013), but to prepare at least twice the amount of items one would deem necessary for the definition of each category (Carretero-Dios and Pérez, 2005; Guillén-Gámez et al., 2023). The goal in overestimating the amount of items is to obtain validity of a construct of qualitative evidence by achieving a correct semantic definition of each category through a minimal number of correctly formulated items. This type of validation seeks to provide statistically significant evidence that will demonstrate the relevance and pertinence of each formulated item. Each set of items in a category should adequately represent one of the tool's general constructs established by the research team (Sireci and Faulkner-Bond, 2014).

We conducted a qualitative approximation of the initial categorization of items and confirmed that the total of initial items adequately reflected the theories we had chosen in our framework (Allport, 1954; Schwartz, 1994; Triandis, 1988). Once we had refined the scale, we correlated the final set of items with one of the three overarching theories (Table 1). The following relationships were identified:

We suggest that TMGs are a collective, social, and cultural activity that closely reflects the intergroup contact hypothesis (Allport, 1954) further elaborated in the intergroup contact theory (Pettigrew, 1998, 2021; Pettigrew and Tropp, 2008, 2011). The intergroup contact theory proposes the following conditions for promoting contact: *equal status, common goals, cooperation, identification,* and *authority support (acceptance of social norms)*. We used these common elements to orient the design and contextualization of the categories in our study (Table 1). The Right to Play (Category 1) is a condition that ensures participation and *equal status* among all participants in a TMG. The Preference for selecting a certain TMG (Category 2) is determined by its nature and its rules, which, in turn, are oriented toward *common goals*, complemented by personal interests or decisions that motivate the preference for a particular game. The choice of game partners in a TMG (Category 3) is determined by well-being, *mutual acceptance, interaction,* and *cooperation,* associated with the *acceptance of* specific *social norms* pertaining to TMGs. Triggered by intergroup contact in structural TMG situations, "Emotions" and "Inclusion" (Category 4) serve as motivators for *cooperation* and self-knowledge within the dimension of introspection.

Viewed from the vantage point of Schwartz's social psychological theory of cultural values (Schwartz, 1994, 2006), the culture of TMGs is not exempt from the same kind of pressures or expectations to which individuals living in a social system are generally exposed. To address social issues arising from the need to preserve individual autonomy within the group, to promote responsible behavior with the aim of guaranteeing social cohesion, and to encourage the adequate use of human and natural resources, Schwartz's theoretical model proposes the consideration and implementation of the following cultural values: *intellectual autonomy, emotional autonomy, membership*

Table 1 Relationship of the scale categories with one of the three social psychology theories featured in the theoretical framework.

Category	Intergroup Contact Theory (Allport, 1954)	Theory of Cultural Values (Schwartz, 1994)	Attitude Theory (Triandis, 1974)
THE RIGHT TO PLAY	Right to play and equal status	Personal and emotional autonomy, group membership, egalitarian commitment, mastery, self-fulfillment	Cognitive component for the development of an attitude
PREFERENCES; HAVING FUN	Common goals within a game-playing context. Social atmosphere	Harmony; harmonic coexistence among individuals	An emotional state associated with the game-playing aspect from the vantage point of introspection. The affective component of an attitude
CHOOSING GAME PARTNERS	Well-being, mutual acceptance, acceptance of norms, differing capacities; cooperation as a tool for inclusivity	Hierarchy and egalitarian commitment. Socialization of individuals by creating relationships of interdependence and well-being	Behavioral predisposition to action. The behavioral component of an attitude
EMOTIONS AND INCLUSION	Cooperation, self-knowledge, introspection	Belonging to the group; conflict resolution. Conservation and tradition	An emotional state associated with game-playing. The affective component of an attitude

Source: the authors.

in the group, *egalitarian commitment, hierarchy, harmony*, and *mastery*. We thus took all these cultural values into account in our elaboration of the categories featured in the scale (Table 1).

The child's Right to Play (Category 1) is closely associated with the application of the values of intellectual autonomy and emotional autonomy, which, in turn, work in favor of the learning experience and stimulate the enjoyment of game-playing in TMGs. *Group immersion* (membership in a group) in TMGs confers meaning to life in a society where certain traditions hold sway. Social *egalitarianism* is embodied in the aspect of participation. *Mastery* (i.e., *self-affirmation*) is achieved through gradual familiarization with the TMG rules and enjoyment of the social atmosphere they engender. Category 2 (Having Fun and Preference for a TMG) includes the aspect of *harmony*, which, in turn, incorporates the acceptance of the social environment within a game-playing context, embodying the values of peaceful coexistence by forming a cohesive unit with other human beings, with nature, and with tradition. Choosing one's game partners (Category 3) includes the aspect of *hierarchy* in developing responsible, respectable behavior with regard to rules or other hierarchical systems associated with the game. The egalitarian aspect is embodied in the socialization of individuals thanks to participation and the creation of social relationships of interdependence and well-being. TMGs reflect "Emotions" and "Inclusion" (Category 4) in the cultural value of belonging to a group (*group immersion*), associated with a search for solutions to emerging conflicts, all of which, in turn, are associated with *preservation* and respect for tradition.

Triandis's Triadic Model of Attitude (Triandis, 1974) comprises three components: cognition (the idea), affect (the associated emotion), and behavior (predisposition to action). Each of these three categories is closely associated with those we implemented in our study. The child's Right to Play (Category 1) is associated with the cognitive representation of a TMG which emerges prior to the development of an attitude. Preference for a certain TMG (Category 2, Preference) includes the variable of an emotional state associated with a TMG's game-playing aspect based on an introspective dimension linked to an emotional component. Choosing one's Game Partners (Category 3) is related to an individual's behavioral component and their predisposition to play a TMG. "Emotions" and "Inclusion" (Category 4) allow us to ascertain the emotional state related to a TMG from an empathetic perspective, which, in turn, is

associated with the affective component of Triandis's theoretical model.

We thus obtained a final scale consisting of 30 items, formulated to be subsumed under four possible subscales with the general goal of having a questionnaire as a tool to evaluate competencies associated with TMGs.

Quantitative approximation. As a statistical procedure to validate the scale, we used approximation based on classical test theory (Abad et al., 2011). As pointed out by Ferrando and Anguiano-Carrasco (2010), factorial analysis allows researchers to evaluate the factorial structure of a measurement tool. According to those authors, one of the most common approximations consists in assuming that a tentative initial approximation that extracts factors from a triple toolkit of *principal components/Eigenvalue > 1/Varimax rotation* is accurate, albeit with certain limitations that can be subsequently corrected by applying randomization techniques and parallel analysis, as indicated by O'connor (2000). A more traditional approximation also offers certain advantages, as pointed out by Pérez and Medrano (2010), as it will examine the relationship between the number of items and the sampling adequacy (Kaiser-Meyer-Olkin measure) along with the appropriateness of subsequently applying confirmatory analysis (Bartlett's sphericity test).

As shown by O'connor (2000) or Faur et al. (2021), parallel analysis can serve as an excellent alternative to the interpretation of factor extraction, as it allows researchers to refine or improve a scale by applying widely employed, well-founded multivariance analysis methods such as confirmatory techniques (Brown, 2015; Marsh et al., 2014; McDonald and Ho, 2002; Faur et al., 2021). In a parallel analysis, attention is focused on the number of components representing the greatest component variance derived from random data (O'connor, 2000). Thus, a determination of components based on a comparison between a traditional extraction method (such as the one indicated above) and parallel analysis can allow for a better operationalization of such factors in view of subsequently applying CFA.

Description of the sample. The sample comprised 276 schoolchildren, of whom 144 (52.2%) were boys and 132 (47.8%) were girls. The median age was 8.71 years (SD = 0.77).

We obtained the sample based on availability. After the mandatory request for permission from the schoolchildren's legal guardians to collect personal information, we presented the

Table 2 Total explained variance.

Component	Initial eigenvalues			Load extraction sums squared			Load rotation sums squared		
	Total	% of variance	Accumulated %	Total	% of variance	Accumulated %	Total	% of variance	Accumulated %
1	5812	19,373	19,373	5812	19,373	19,373	4324	14,414	14,414
2	2509	8365	27,737	2509	8365	27,737	2342	7808	22,222
3	1929	6429	34,166	1929	6429	34,166	2013	6711	28,933
4	1387	4625	38,791	1387	4625	38,791	1658	5526	34,459
5	1299	4330	43,120	1299	4330	43,120	1646	5487	39,946
6	1257	4191	47,312	1257	4191	47,312	1486	4954	44,899
7	1199	3995	51,307	1199	3995	51,307	1401	4669	49,569
8	1143	3811	55,119	1143	3811	55,119	1391	4637	54,206
9	1029	3432	58,550	1029	3432	58,550	1303	4344	58,550
10	985	3284	61,834						

children with a questionnaire in pen-and-paper format. In all classrooms to which we were allowed access, the class teachers were present when their students filled out the questionnaires. The voluntary nature of participation was emphasized, and anonymization of data was ensured. All students present in the classroom completed the questionnaire.

Statistical treatment. For descriptive analysis and EFA, we used the SPSS 22.0 statistical package. For CFA, we used the AMOS 2.0 package.

Scale validation results
In order to perform a scale quantitative validation, we first carried out an Exploratory Factor Analysis, then a parallel analysis, and finally a Confirmatory Factor Analysis, as the ones in the studies by Zarza-Alzugaray et al. (2021).

Analysis of items and pertinence of factorial analysis. An initial 30-item factorial analysis approximation revealed the pertinence thereof with a KMO index of 0.787 and Bartlett's sphericity χ^2_{435} equal to 2153.757; $p = 0.000$.

According to guidelines laid out by Mazas et al. (2013) and Zarza-Alzugaray et al. (2021), two essential aspects need to be taken into account at this point of the validation process: (1) the proportion of variance explained by the first factor, and (2) the difference between the variance explained by the first factor and the variance explained by the remaining factors. Regarding the first aspect, the first factor (19.375%) explains over 30% of the total variance explained by all nine factors, with eigenvalues greater than 1. According to Reckase (1979) or da Cruz Silveira et al. (2024), any explanatory power provided by one sole factor amounting to 20% or more is considered remarkable. Consequently, the 30 items in our scale load mainly on the first factor. Regarding Aspect 2), the second factor explains 8.36% of the total variance, and the third factor explains 6.24%, gradually decreasing until reaching 3% explained by the ninth factor. As explained by Mazas et al. (2013) and Zarza-Alzugaray et al. (2021), one of the key parameters for regarding factorial reduction as reliable with this extraction method is that the difference in explanatory power between the second and third factors is less than the difference between the first and second factors. That rule is fulfilled in our case.

The initial extraction of principal scale components (Varimax rotation) yields nine factors with eigenvalues greater than 1, which explains 58.50% of the scale's variance: they are distributed as shown in Table 2.

This initial 9-factor solution and the grouping of items did not fully correspond with our postulate derived from qualitative research. We also observed a low discrimination power between

Table 3 Eigenvalues from EFA and parallel analysis.

Root	Parallel analysis	Factor analysis principal components
1	1.674	5.812
2	1.578	2.509
3	1.504	1.929
4	1.442	1.387

the error variance and the total variance of factors extracted from principal components. This shows that on several occasions, factorial estimations of the weights of several factors had been overestimated and that the number of dimensions was too high (Ferrando and Anguiano-Carrasco, 2010).

To avoid potential errors indicated by the authors mentioned above, we carried out a parallel analysis to complement our initial approach. The parallel analysis of a scale can be interpreted as a mixture between Kaiser's criterion (i.e., retaining only eigenvalues greater than 1 as factors) and a scree plot. With this method, researchers can generate a random correlation matrix based on data lying along the same dimension as the empirical data (subjects and variables). Theoretically, a matrix with those characteristics should have all eigenvalues close to 1. In consequence, parallel analysis compares eigenvalues emerging from the randomly generated matrix with the empirical values stemming from the matrix of real data (Ferrando and Anguiano-Carrasco, 2010; O'connor, 2000).

The SPSS program we used for analysis and factor reduction does not offer the option of conducting a parallel analysis of items. However, it does allow researchers to program such an analysis as a syntax extension. We therefore proceeded to follow the syntax model for parallel analysis as proposed by O'connor (2000) and replicated by researchers such as Mertens et al. (2020) or Krieglstein et al. (2023).

As can be seen in Table 3, there is a clear point of inflection in the number of factors resulting from the principal component extraction method compared with the parallel analysis method: the point of inflection arrives at Factor No. 4. It would thus not be coherent to maintain Factors 4, 5, 6, 7, 8, and 9 from the principal component method, since the eigenvalues and the variance they explain is lower in the empirical data than the randomly obtained variance in parallel analysis. We can thus only admit the presence of three factors possessing eigenvalues and real explanatory power that actually improve the explanatory power of factors obtained from randomization of the real empirical data.

This is the point where it makes sense to propose a tentative scale refinement model based on confirmatory factor analysis, allowing us to select and group the items into their respective categories. In this way, in our attempt to obtain a valid and
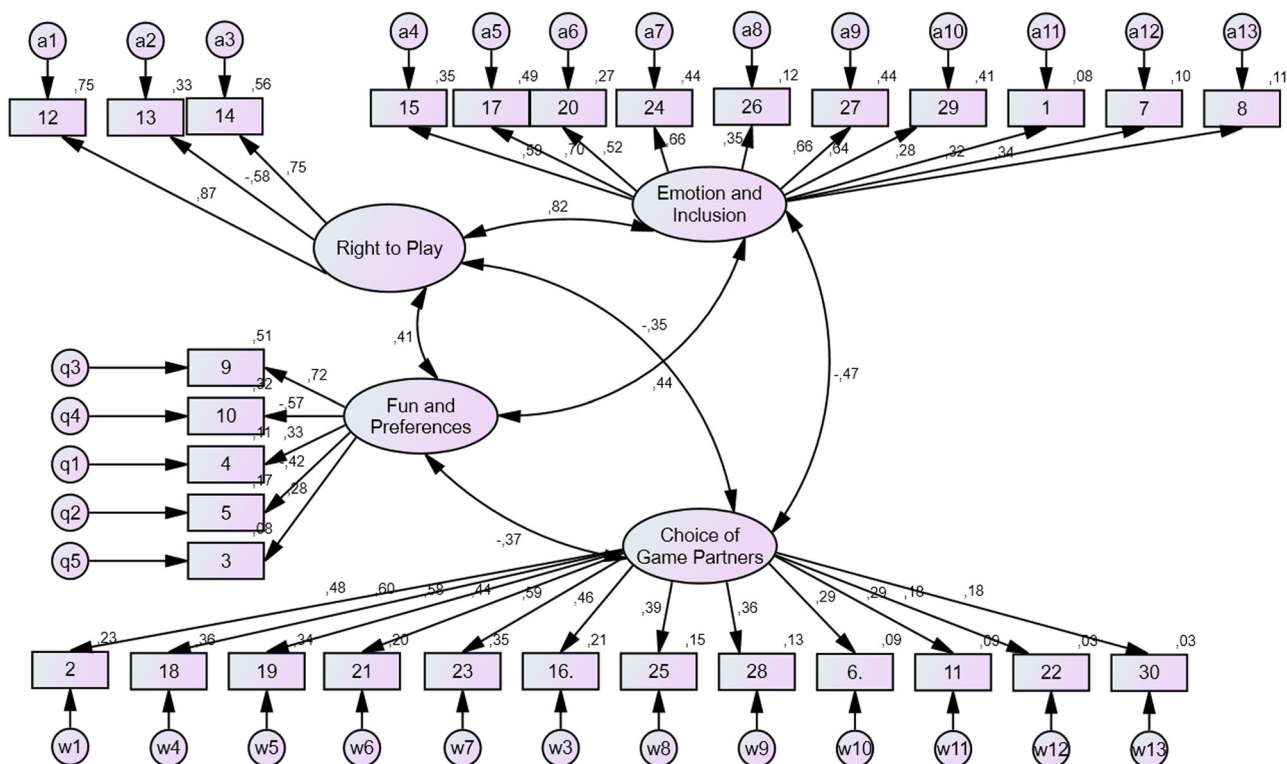
Fig. 1 Preliminary CFA path. Initial Confirmatory Factor Analysis.

reliable tool, we managed to refine the scale in both qualitative and quantitative terms.

CFA. We chose to start by conducting an approximation of the model with the four theoretical categories that emerged from our initial qualitative analysis. The 30 items grouped on the 4-factor model as follows:

C1 (Right to Play): 12, 13, and 14.

C2 (Fun and preferences): 3, 4, 5, 9, and 10.

C3 (Choosing game partners): 2, 6, 11, 16, 18, 19, 21, 22, 23, 25, 28, and 30.

C4 (Emotions and Inclusion): 1, 7, 8, 15, 17, 20, 24, 26, 27, and 29.

This first model presented adjustment data that can be regarded as acceptable, although there was still room for improvement, as could be observed from the recommendations made by Browne and Cudeck (1993) and Brown (2015) regarding minimum acceptable thresholds. The *CMIN/df* index was 2.064, the *CFI* was 0.765, and the *RMSEA* was equal to 0.062. In the same manner, although regression weights were significant, some were very low (<0.40), as seen in Fig. 1.

To refine the scale, we proceeded to eliminate certain items on three different grounds: (1) given their factorial load, (2) taking into account certain modification indexes, and (3) given the need to control the error variance of the relationship between items of dubious discriminatory power. Our refinement of the scale thus resulted in the elimination of the following items from the model: 1, 3, 4, 6, 7, 8, 11, 13, 22, 25, 26, and 30. The final CFA path we obtained can be observed in Fig. 2.

This factorial approximation presents adjustment data with a clearly better fit than the first approximation. Its *CMIN/df* index is equal to 1.653, the *CFI* is equal to 0.929, the *RMSEA* is 0.049, and $ECVI_{Defau} < ECVI_{Saturated}$. This model thus fulfills the adjustment criteria established by Zarza-Alzugaray et al. (2021).

In Fig. 2, we also note that all regression indexes are superior to 0.40 except Item 28, which we nevertheless preferred to maintain in the questionnaire due to its close congruence with our theoretical framework.

We also conducted a bootstrapping analysis. Bootstrapping is a resampling of data, replacing the data *n* times with the aim of generating an empirical estimation of the entire sampling distribution (Mooney and Duval, 1993; Lai, 2018). This type of technique can be advisable when the original sample could eventually be regarded as insufficient, as explained by Aimran et al. (2016) and by Fiedler and Spychiger (2017). Indeed, this could have been the case in our investigation. With a resampling of $n = 10,000$ subjects, we obtained a Bollen-Stine bootstrap *p*-value = 0.334. We can thus assume, with certainty, that the model proposed in Fig. 2 fits the empirical data.

The final scale

The final, definite questionnaire has a good fit with a 4-factor model featuring a total of 18 items. This total number of items (18) is considerably lower than the initial one (30), but that reduction was intentional: in view of a statistical validation process, we had foreseen more items than necessary (Carretero-Dios and Pérez, 2005; Mazas et al., 2013; Sireci and Faulkner-Bond, 2014).

Despite the elimination of 12 items, the 18 final items still reflect all of the research issues that had emerged from the theoretical framework.

Taking that theoretical framework into account along with its appropriate qualitative interpretation in agreement with the obtained results, we ascertain that the resulting Category 1 (C1) corresponds with a category of the questionnaire, featuring issues related to the *Right to Play*, and comprising items 12 and 14.

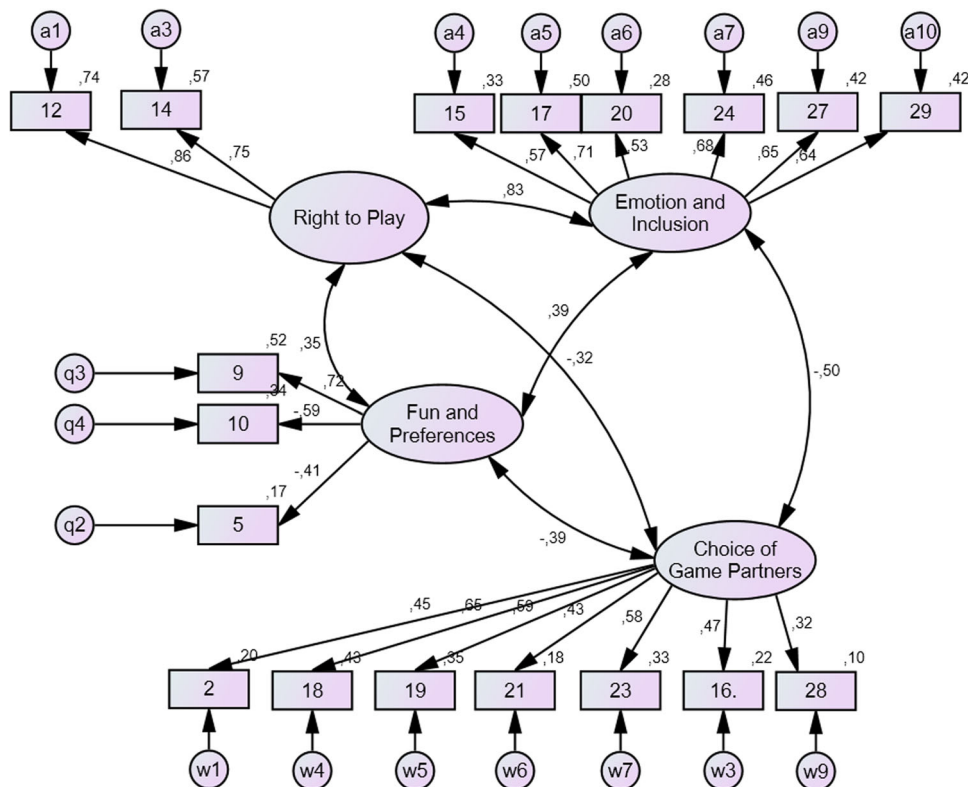Category 2 (C2), termed *Fun and Preferences*, is formed by items 5, 9, and 10.

Fig. 2 Final CFA path. Adjusted Confirmatory Factor Analysis.

The component termed *Choice of Game Partners* marks the third category, C3, made up of items 2, 16, 18, 19, 21, 23, and 28.

The final category, C4, is called *Emotions and Inclusion*, and it is made up of items 15, 17, 20, 24, 27, and 29.

In Table 4, we present the relationship of the items of each category with the principles expounded in the original framework theories.

Discussion and conclusions

In the literature, we find that there are few indicators and scales on the subject of game activities (Gülgönen and Corona, 2019; Payà and Bantulà, 2021; Tuñón et al. 2014). Government education policies consequently do not tend to feature games in their guidelines. "This absence not only confirms the need to promote the recognition of children's universal right to play, but also the urgent need to have an efficient tool—such as a system of indicators—designed to evaluate the implementation of games" (Payà and Bantulà, 2021, p. 291). Game-playing is not an extraneous aspect but an indispensable element in children's lives. Through cultural games that involve dynamic and motor activity, they explore the world around them, discover new things, experiment, and get to know their own culture and other cultures while learning and developing their physical and social aptitudes (Azhara and Sutapa, 2019; Marouli et al., 2016). TMGs add the musical dimension to game-playing and associate music with the training of physical, cognitive, and artistic skills in an activity that promotes our intangible cultural heritage with the practice, visibility, dissemination, and conservation of games and traditional culture. The scale we validated in this study is designed to serve as an efficacious tool to value and evaluate music as a vehicle that encourages and augments the transmission of culture, including popular songs of former and present times, as they are shared with others through the TMG activity (Civallero, 2007). In accordance with our study's goals, the scale's

analysis of intrinsic TMG competencies allows us to identify individual aptitudes and attitudes associated with children's socialization and their choice of game partners according to criteria such as hierarchic systems, interdependent relationships, and well-being (Kaufman et al., 2019; Schwartz, 2006). The new scale also allows us to analyze the emotional/affective component by studying emotions and behaviors associated with children's perceptions and their mode of relating with others through game activities. The emotions generated by sociomotor activities related to TMG differ from those generated in psychomotor activities (Niubò-Solé et al. 2022). This validated scale thus provides a new contribution to scientific research in the area of emotional game-related processes, allowing researchers to grasp and predict human thoughts and behavior by studying cognitive processes such as attention, learning, memory, decision-making (Dukes et al., 2021) and the study of emotions transmitted by motor games (Lavega, 2018), TMG among them. Language, music, movements, and social values involved in the practice of TMG help to improve skills such as listening, speaking, rhythm, and developing a cooperative attitude (Sallabaş, 2020) as the main educational factors.

Apart from observing intergroup attitudes determined by the traits of each group and obtaining reinforcement from observing interactions and social norms associated with the TMG, the current scale foresees the analysis of empathy, an emotion that is known to minimize prejudice, promote social change, and improve intergroup relations. Our study also confirms the role of intergroup contact as an inherent trait of TMGs: intergroup contact serves as a key element to combat stereotypes, and prejudice (Pettigrew, 2021b; Pettigrew and Tropp, 2011), and reduce inequalities while helping to preserve the cultural identity provided by traditional musical values. The scale obtained in this study can also serve as a tool for the advancement of research on the inherent educational potential of TMGs (Mallol, 2019; Ruiz, 2012).

Table 4 Relationship of the scale's items and categories with the three framework theories.

Category	Allport (1954) Intergroup Contact Theory	Schwartz (1994) Theory of Cultural Values	Triandis (1974) Attitude theory	Items
1. RIGHT TO PLAY	1. Right to equal status within a game (Egalitarian commitment)	1. Competency, a cultural value of personal development through self-affirmation (Competency)	1. An attitudinal concept prior to the game (Cognitive component)	12 = "All boys and girls can play games with songs." 14 = "Any boy or girl has the right to play with the others."
2. PREFERENCE FOR CERTAIN MUSICAL GAMES	2. Preferring games featuring songs (social atmosphere)	2. Harmony, harmonious coexistence, context (harmony)	2. An emotional state associated with the game-playing aspect from an introspective angle (affective component)	5 = "If a game has a song, I prefer to sing while playing it." 9 = "I like games in which everybody can sing together." 10 = "Games featuring songs are more fun."
3. CHOOSING GAME PARTNERS	3. Acceptance of social norms from the angle of individual personality (personality)	3. Hierarchy vs. egalitarianism; Socialized individuals creating social well-being and social interdependencies (hierarchy-egalitarianism)	3. Behavioral predisposition to play (behavioral component)	2 = "A game on a Playstation is a traditional game (with online game partners)." 16 = "When I play with boys and girls, sometimes I shout and insult them." 18 = "I would never play with certain children because they're not like me." 19 = "To form a team, I prefer to choose teammates of my own sex." 21 = "Girls play girl games and boys play boy games." 23 = "I prefer to play only with boys or only with girls." 28 = "I don't play with disabled children because they can't play our games."
4. EMOTIONS AND INCLUSION	4. A condition of cooperation in games from the vantage point of introspection (cooperation-introspection)	4. Conservation vs. autonomy; Solutions to conflicts between the individual and the group (conservation-autonomy)	4. An emotional state associated with the game-playing aspect from an empathetic angle (affective component)	15 = "When I play with other children, I make sure not to harm them because I want them to enjoy playing with me." 17 = "If a classmate is alone and not playing with anyone, I try to let them play because I care about how they feel." 20 = "For me, it's the same if I play with boys or with girls." 24 = "If a classmate is left alone, I'd rather invite them to play so that they're not left alone." 27 = "I like to share games with girls and boys who have other capacities." 29 = "Visually disabled children can also play with us."

Source: The authors.

We thus conclude that TMGs are one of children's basic needs. As an integral educational activity, TMGs encourage children's physical, intellectual, social, emotional, and cultural development. These characteristics enhance the child´s development and protect their physical and mental integrity, both of which are included in the universal rights of the child. The right to participate, implicit in the TMG, also helps the child to develop an identity of their own, which is also built through the design of selection criteria for games and playmates. These conclusions confirm the appropriateness of the questions posed for this research and therefore, of the design of this questionnaire. The need for research and evidence in this field of study requires that further measurement instruments or scales, such as the one proposed herein, be designed and validated. Our scale's replicability will help confirm its viability and serve as a motivation for further research, promotion, and recognition of TMGs as an educational element that reinforces identity in diverse cultural communities worldwide.

Educational implications

In line with observations made by Payà and Bantulà (2019), this scale's contributions as a tool for educational analysis of TMGs and their incorporation into action plans for children will encourage the development of government policies designed to promote inclusive emotional development in education.

From a theoretical perspective, it would be necessary for government administrative organs and legislation to take these findings into account and put them into practice; moreover, educational institutions should foresee appropriate spaces and schedule slots for TMG activities (Payà and Bantulà, 2021). The field of education has many possibilities that can work in favor of egalitarian inclusion, using TMGs as a universally applicable activity. "Those who most need to have games as an important ally that can contribute to their development are the most disadvantaged children, the most vulnerable, those living in poverty, those who grow up without parental care, who suffer various types of exploitation, violence, abuse or mistreatment" (Payà and Bantulà, 2021, p. 292) and disabled children, who may also feel rejected by their pairs in regular educational contexts (Bossaert et al., 2013; March-Llanes et al., 2023). In such portions of the population, the risk of exclusion can be reduced by promoting TMGs as a naturally inclusive activity that encourages the participation of all students. The rules of the game orient participants and invite them to communicate with one another, establish relationships, escape from reality for a moment, and share a cultural, communitarian musical experience together. For children not accustomed to playing with their peers, TMGs can serve as a fun educational activity that reinforces their cultural role in society while triggering and promoting the development of cognitive, physical, social, and emotional skills (Azhara and Sutapa, 2019).

From a practical point of view, personal interactions need experiences that enhance communication, social relationships, and emotional development when working on correlated competencies. Research on the social and emotional competencies integrated into the TMG may serve as a basis for predicting and train linguistic communication competency. (Llorent et al., 2020). In the cognitive dimension (as evaluated by our scale), TMGs incorporate songs into games, thereby encouraging all children to participate: they help them grow their vocabulary, perfect their mnemonic capacity, and develop their capabilities for expression.

TMGs are also a physical activity; the open spaces where they take place encourage psychomotor coordination by combining movement, percussion, and/or dance. The intrinsic dynamics of the TMG activities are materialized with hand games, dramatic representations, and choreographic accompaniments to traditional songs (Riera and Casals, 2021). Participants interact physically with their peers and the space through in they are moving. The rhythmic, corporal, or chorographical games that accompany TMG songs can activate muscle tone while encouraging the development of gross and fine motor skills, balance, and coordination.

TMGs can also educate children in social behavior by helping them apprehend and apply consensual rules. As an educational sociocultural activity, TMGs help children learn and acknowledge a series of societal rules and norms (Tuñón et al., 2014).

On the other hand, measuring the emotional intensity in children´s motor games (Alcaraz-Muñoz et al., 2022) may help to know the kind of emotional experiences these practices play. Body interaction in body percussion activities, associative interaction dynamics, and group interaction featured in playful and expressive cooperative motor situations stimulate a child's skills of approximation, relation, and communication (both verbal and non-verbal) along with the development of positive emotions, social competencies (Alonso et al., 2019; Dias et al., 2022) and the formation of affective bonds with their peers.

Given that the globalization of society constitutes a serious threat to the preservation of traditional games and ethnomusical heritage, and also in view of an increasing general disinterest, cultural ignorance, and loss of identity, the legislative and educational promotion of TMGs should result in scientific arguments in favor of applying them as an essential cultural manifestation that enhances socialization and the formation of cultural identity while enriching the array of game resources at children's disposal (Ruiz, 2012).

Limitations and future implications

The main limitation of this study lay in the fact that our quantitative approach to the object of study consisted of sampling through availability. Our results should thus be completed by the design of qualitative protocols that yield new results and interpretations different from those presented herein in order to obtain a more comprehensive grasp of the issues involved.

As pointed out by Nassaji (2020), such a potential qualitative approximation would be entirely naturalistic, and the treated data would be non-numerical. Such a qualitative approach would seek to achieve a more profound exploration and treatment of such data. At the same time, it would require contextual explanation and interpretation, focusing on the development guidelines and the research process rather than its product or result.

We thus believe that the next step in this type of research should consist of forming discussion groups of students and teachers involved in a debate with open questions that would further illuminate the fascinating subject of traditional musical games.

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Author contributions

Francisco Javier Zarza: conceptualization/formal analysis/validation/methodology/writing original draft/writing review and editing. Carmen Fernández Amat: conceptualization/formal analysis/funding acquisition/project administration/writing original draft/writing review and editing. Luis del Barrio Aranda: conceptualization/formal analysis/writing original draft/writing review and editing.

Competing interests

The authors declare no competing interests.

Ethical approval

Informed consent

In this paper, informed consent was obtained from all participants and/or their legal guardians.

Additional information