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**Measures of empathy in children and adolescents: A systematic review of questionnaires**

Sesso G *et al*. Measures of empathy

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**Abstract**

BACKGROUND

Empathy has long been considered a multidimensional construct, encompassing cognitive, affective and behavioral domains. Deficits in empathic competences in early childhood contribute to psychopathology, and have been variably implicated in several clinical conditions, such as autism spectrum disorders (ASD) and conduct disorders.

AIM

To identify and describe empirically validated questionnaires assessing empathy in children and adolescents and to provide a summary of related theoretical perspectives on empathy definitional issues.

METHODS

A systematic review of the literature was conducted. Three bibliographic databases were searched. A total of 47 studies were selected for final analysis and 16 distinct measures were identified and described.

RESULTS

Questionable to excellent levels of internal consistency were observed, while few studies assessed test–retest reliability. Although construct definitions only partially overlapped, affective and cognitive domains of empathy were the commonest internal factors that were often separately evaluated. New facets of the construct (*i.e.*, somatic empathy and sympathy) and specific clinical populations (*i.e.*, ASD) could be specifically addressed through more recent instruments.

CONCLUSION

The combination of different assessment methods is recommended in order to foresee further improvements in this field and try to overcome the problem of limited convergence with more objective measures.

**Key words:** Empathy; Assessment; Child; Adolescent; Autistic disorder; Conduct disorder

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**Core tip:** Measures of empathy in children and adolescents constitute useful clinical tools for evaluating impairments in empathic competences and social skills within neurodevelopmental disorders and psychiatric conditions. However, the choice of the instrument to use should clearly vary, depending on the setting and the object of study. The present review could be useful to clinicians and researchers to allow a direct comparison of the available measures and identify strengths and limitations of each one depending on different purposes.

**INTRODUCTION**

In the 19th century, theterm *Einfühlung (ein-* ‘into’ *+ Fühlung ‘*feeling’) was first coined by Vischer to mean humans’ spontaneous projection of psychic feelings into people and things they perceive[1]. Later, the term empathy(from Greek empatheia: *em-* ‘in’ + *pathos* ‘feeling’)was suggested by Titchener as a process of humanizing objects and feeling ourselves into them[2]. Psychoanalysis from its beginning was attracted by the concept, viewed as the process of “feeling in the guise” of another person to better understand how therapy works[3]. Since then, many other disciplines of psychology demonstrated a broad interest in empathy[4], and the construct has proved itself as highly relevant to psychiatric research and clinical practice with patients affected by autism spectrum disorders (ASD) or psychopathy[5].

The acquisition of empathy is considered an essential component of moral development, and empirical relationships between many forms of prosocial behavior and empathy have been demonstrated. Indeed, empathy plays an important role in the development of social competence[6]. Adolescents with higher levels of trait empathy exhibit more prosocial and altruistic behavior, whereas adolescents with lower levels of empathy have been shown to be more aggressive. Deficits in empathic competences in early childhood contribute to psychopathology later in life, and have been implicated in the development of antisocial behaviors, bullying, aggression, sexual offending, and serious violent crime. Iindividuals who share and comprehend another’s distress, which occurs as a result of their own aggressive or antisocial behavior, may be less inclined to continue with this behavior or act in an antisocial or aggressive manner in the future[6]. Reduced empathy is also observed in children with conduct disorder (CD) and callous–unemotional traits[7-9]. However, few studies have distinguished between proactive and reactive aggression; the former of which may be more strongly associated to low empathy levels, thus often resulting in a nonsignificant relationship between empathy and overall aggression.

Empathy deficits have also been implicated in several other neurodevelopmental disorders, among which autism is one of the most studied. The so-called extreme male brain theory of autism[10,11] proposes that individuals with ASD show reduced empathy and perform worse on empathy-related tasks that normally give rise to female superiority, especially reflecting a specific cognitive empathy impairment. Additionally, novel hypotheses that imply empathy deficits in different mental disorders have emerged in the last decade. Among such conditions, attention deficit and hyperactivity disorder[12-15] and anorexia nervosa[16-18] revealed empathic defects by means of both self- and parent-reported questionnaires.

Despite its relevance, the construct of empathy has posed noteworthy definitional issues that are still under debate. For instance, eight different conceptualizations of empathy have been reported by Batson[19]. Empathy has been first identified as a primarily affective phenomenon, referring to the immediate experience of the emotions of another person[20]. A definition of empathy, as a primarily cognitive construct, has been subsequently proposed, referring to the intellectual understanding of another’s experience[21]. However, since the initial differentiation of its instinctive and intellectualized facets in the 18th and 19th centuries, empathy has been considered a complex multidimensional concept, including both cognitive and affective facets, or manifesting either in the cognitive or the affective domain, depending on the situation[22]. Indeed, empathy has been conceptualized as a superordinate category with subclasses of phenomena sharing the same mechanism, including emotional contagion, sympathy, cognitive empathy, helping behavior, and empathic perspective taking[23,24]. Decety and Jackson[25] identified four subjectively experienced components of empathy, *i.e.*, affective sharing, self-awareness, perspective taking, and emotion regulation. A 3D model has also been proposed, including the affective response, the cognitive processing, and the conscious decision making to undertake an empathic or prosocial action[26].

Although empirical literature has not always consistently distinguished between these subtypes of empathy, neurobiological research has indeed suggested that these components reflect independent processes and are governed by separate brain systems[27]. Prefrontal circuits are believed to facilitate empathic responses through enhancing working memory and improving the ability to assess likely outcomes[23]. In addition, anterior insula and anterior cingulate cortex are activated during the empathic experience of others’ pain, while the medial dorsal and orbitofrontal cortex and the right temporoparietal junction are activated by empathy appraisals[27]. Converging evidence from several studies shows that the inferior frontal gyrus and the inferior parietal lobule are necessary for affective empathy, while the ventromedial prefrontal cortex, temporoparietal junction, and the medial temporal lobe are key regions for cognitive empathy[28]. Intriguingly, correlates of empathy subtypes have been measured using several physiological measures, such as electromyography (EMG), somatosensory event-related potentials, and transcranial-magnetic-stimulation-induced motor-evoked potentials[29].

Several approaches have been used to measure empathy, with the first instruments dating back to the 1940s, *e.g.*, Dymond’s Scale for the Measurement of Empathic Ability[30]. From the 1980s, physiological measurements, such as skin conductance and heart rate, were increasingly being used and, later, empathy measurement has been influenced by the development of social–cognitive neuroscience. Empathy measures have been previously generally reviewed elsewhere[22,31,32]. In particular, Neumann *et al*[33] provided a brief and succinct review of empathy measures, distinguishing behavioral measures (including reactions to strips or picture stimuli), neurophysiological approaches (*e.g.*, functional magnetic resonance imaging, facial EMG, electroencephalography and evoked related potentials) and self-report questionnaires. Among the last category, the authors included eight measures, of which only three were validated in children and adolescents [Feeling and Thinking (F&T) scale, Basic Empathy Scale (BES), Griffith empathy measure (GEM)]; further, one behavioral measure (Kids’ Empathetic Development Scale) was specifically intended to be administered to children.

Miller and Eisenberg[34] first systematically reviewed studies correlating empathy and behavior in children and adolescents, subdividing them by the mode of assessing empathy. They identified four methods traditionally used to assess empathy in children. These include picture and/or story methods, in which probands respond to hypothetical stories; experimental induction procedures, designed to elicit empathic responses; facial affect and/or gestural reactions to others’ emotions, as depicted in films or picture stimuli; and self-, parent- or teacher-report questionnaires. Each of these methods has advantages and disadvantages[35]. While most real-life social and interpersonal situations are complex and dynamic, and involve multiple players, most test scenarios rely on very simple two-person interactions. Moreover, infants and young children respond to others’ emotions before developing the ability to express or define an emotion lexicon[34]. Laboratory-based stimuli are expensive, relatively invasive, and not suited for large community studies and clinical diagnostic settings. Facial and gestural responses to empathy-inducing stimuli, as well as physiological measures, also tend to be complicated, usually involving special equipment and time-consuming data processing and analysis. Even though these types of data are relatively independent of social desirability, young children may react to the physiological equipment. In addition, Problems also arise with these measures when trying to disentangle or distinguish between physiological responses for empathy, sympathy and distress, as there is little observable physiological distinction between them[36,37].

There are substantial problems with using self-report questionnaires of empathy in children[33]. Indeed, young children lack the cognitive and verbal abilities to report on internal states. For older children, their reports of affective empathy and their scores on picture/story indices still do not converge with their prosocial behavior and are heavily affected by demand characteristics. Nonetheless, self-report can be a vital tool for some research questions, with responses reflecting attitudes and likely behavior. The inclusion of a social desirability assessment is also recommended, as children have a tendency to provide socially acceptable answers to please others, which is a major general limitation of self-administered questionnaires, so it would be advisable to complement the evaluation of the construct with other measures and informants[35]. Parent or teacher surveys are relatively unbiased and more cost- and time-efficient, especially when studying young children[35]. Anyway, self- or others-reported questionnaires remain the most common method for structured assessment of the behavioral correlates of empathy both in adults and in children and adolescents. While multimethod approaches are clearly favored in basic research, such approaches are not fully applicable to the clinical context, where both timing and setting often limit the extent of more thorough investigation. In fact, rating scales and questionnaires are essential to clinical evaluation for therapeutic and research purposes.

Clinicians and researchers in the neurodevelopmental field still lack a comprehensive overview of validated questionnaires for measuring empathy. Indeed, a systematic review of studies validating questionnaires that clinically evaluate empathy deficits in the pediatric population was published in French in 2016[38]. However, it was limited to the adolescent population (age 12–18 years) and to the period from January 2002 to December 2012, and it was mainly aimed at assessing the clinical features of empathy deficits. Only three validated instruments, namely the BES, the GEM and the Interpersonal reactivity index (IRI), were selected and described. Given the apparent lack of exhaustive and thorough reviews on the topic, published in English, we conducted an updated systematic review of the existing literature on questionnaires assessing empathy validated in children and adolescents. The main goal of our search was to identify the available measures of empathy, and to define how reliable and valid they are. As a consequence, we decided to restrain our search to studies aimed at validating empathy questionnaires (EQ). Psychometric validation of multiple-item scales is an integral and essential part of data analysis, to allow a direct comparison of distinct measures used to assess the same construct. Nevertheless, applied research often do not include psychometric evaluations of the tools, which results in the common use of measures with insufficient proof of validity and reliability and raises concerns on their applicability[39]. Thus, including studies that did not provide a psychometric validation of the used empathy measures would have had little meaning in the present systematic review, whose scope was, among the others, to compare the robustness of each tool. Moreover, since we were interested in identifying the definitions of the construct and the components on which each measurement was based, we provided measures structure comparison with a summary of related theoretical perspectives on empathy definitional issues which are relevant to neurodevelopmental disorders.

**MATERIALS AND METHODS**

***Search***

A systematic review of the literature was conducted and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used to describe procedures and results[40]. PubMed, Scopus and Web of Science bibliographic database were searched from their date of inception to February 2019. Reference lists of included studies were also carefully searched for relevant citations. The research team discussed and reviewed the results of an initial scoping search. We developed a strategy using four groups of search terms. These were: empathy OR empathic (group 1) AND questionnaire OR measure OR measurement OR scale (group 2) AND child OR children OR adolescent OR youth (group 3) AND validity OR validation (group 4). In summary, the strategy was to include all relevant abstracts relating to groups 1–4. Terms were adapted as necessary for each database. Results were downloaded into Mendeley software. The search included reviews and original studies. If a previous review was found, we searched the reference list to identify and retrieve the primary studies.

***Eligibility criteria***

**Studies were included if they met the following criteria:** Study design: studies aimed at presenting or validating original questionnaires of the psychological construct of empathy, validating their adaptations to other samples or translations into different languages, or further evaluating psychometric properties of these measures.

**Comparison:** No restriction for comparison groups was applied.

**Participants:** Children, adolescents and/or young people under 21 years old.

**Definition:** Any definition of the empathy term was accepted.

**Measures:** Any questionnaire assessing empathy, including paper-and-pencil or computer-administered measures.

**Studies were excluded if they met at least one of the following criteria:** (1) the study was not aimed at validating a measure (*e.g.*, assessing a clinical cohort or comparing it with a control population by means of a specific measure);(2) the study was aimed at validating a measure other than a questionnaire (*e.g.*, picture-based tasks or experimental procedures);(3) the validated questionnaire was intended to assess a related psychological construct other than empathy (*e.g.*, social skills, aggressive behaviors, callous–unemotional traits) or to provide diagnostic measures for psychopathy and antisocial personality, ASD and Asperger syndrome, social anxiety;(4) the validated questionnaire was not intended to primarily assess empathy but more general related constructs that only marginally included empathy-related subscales (these measures will be considered in the Discussion);(5) the validation was performed on samples including adults or young adults aged ≥ 21 years;(6) the full-text article was written and published in a language other than English, French, Spanish or Italian (only these languages are well mastered by the authors);and(7) reviews (they will be considered in the Discussion).

***Abstract screening***

We retrieved 911 abstracts using our search strategy, and 285 were removed as duplicates. Ten additional records were identified through other sources (citations in reference lists of screened papers and reviews). Thus, 626 + 10 abstracts were screened. If a title appeared potentially eligible, but no abstract was available, the full-text article was retrieved. Two researchers (Sesso G and Brancati GE) scanned all titles and abstracts to identify relevant articles for full-text retrieval. Any disagreements were resolved by consensus.

***Data collection process***

For each study, data on participants and setting, country and language of validation, size, age and gender of the sample and relevant measurements were extracted from full-text papers. For each measure, full name and abbreviation of the scale, number of subscales and items, number of response points for Likert-type scales, identity of responders (self- or parent-reported), empathy definition on which they are based, and data on reliability and validity were also extracted. Finally, data on languages of translation, novel versions or adaptations, and psychometric properties were extracted from full-text papers that were not aimed at presenting or validating original measures.

***Synthesis of results***

The included studies were heterogeneous in terms of definition and measurement of empathy; hence, we report a narrative synthesis of the findings together with discussion of relevant theoretical background. For each assessment scale we identified psychometric properties from the correspondent paper or from the wider literature. In order to synthesize the articles, identified through our search, we partitioned the papers in four groups: those aimed at presenting or validating original questionnaires; those aimed at validating novel versions or adaptations; those aimed at validating their translations into different languages; and those aimed at further evaluating psychometric properties of validated measures. Original measures were also classified based on validation in infants, preschool children, children and/or adolescents, and as parent- or self-rated.

**RESULTS**

***Study selection and excluded measures***

The PRISMA flowchart (Figure 1) shows the process of identification and selection of papers. We excluded 572 records based solely on title or abstract. A total of 64 full-text articles were thoroughly assessed, of which 17 were excluded. The main reasons for exclusion were: the study was aimed at validating a measure other than a questionnaire (*n* = 4); the validation was performed on samples including adults or young adults ≥ 21 years old (*n* = 10); or the full-text article was written in a language other than English, French, Spanish or Italian (*n* = 3).

We excluded measures intended to assess psychological constructs such as aggressive behavior and callous–unemotional traits, or to provide diagnostic clues for psychopathy and antisocial personality, which have been recently reviewed by Masi *et al*[41], and for ASD and Asperger syndrome, for which we refer to the broad available literature on the topic. We extended our search to the entire pediatric population, including infants, preschool children, school-age children and adolescents, but limited it to only paper-and-pencil or computer-administered questionnaires, both self- and parent-report (for instance, we excluded the Young Children’s Empathy Measure[42] as it is a vignette-based interview).

Only full-text articles written and published in English, French, Spanish or Italian were retrieved, since these are the only languages that are sufficiently mastered by the authors to fully access the content of the papers. Unfortunately, the Media-Based Empathy Scale[43] was excluded, although being the only existing measure of empathy in the context of media use, since the full-text article was written in German, as well as the Child and Adolescent Forms of the KA–Sİ Empathic Tendency Scale[44,45], a self-reported questionnaire with affective and cognitive empathy subscales, whose validating articles were published in Turkish.

We also excluded validated questionnaires that were not intended to primarily assess empathy, but more general related constructs (*e.g.*, social competences and emotion recognition) that only marginally included empathy-related subscales. Specifically, we did not consider in our final qualitative synthesis the following questionnaires: the Emotion Recognition Scale[46]; How I Think Questionnaire measuring cognitive distortions[47]; Interpersonal Gratitude Scale for Children[48]; Infant–Toddler Social and Emotional Assessment with its empathy factor[49]; Children’s Behavior Questionnaire with its empathy subscale[50]; Multisource Assessment of Children Social Competence[51]; measure of adolescents’ Prosocial Moral Reasoning[52]; Self-Compassion Scale[53]; Toronto Alexithymia Scale[54]; and Impulsiveness and Venturesomeness Scale with its empathy subscale[55]. Most of these measures include an empathy-related subscale or similar factors, which explore either the general construct of empathy or socially oriented behaviors and prosocial skills, without further defining the quality of such phenomenon. As we extensively discussed above, a finer description of empathy-related dimensions is among the main objectives of the questionnaires we selected in the present review, which is far from the scope of the above listed measures primarily intended to assess socioemotional and interpersonal aspects or related constructs.

For historical purposes, we should also mention the Hogan Empathy Scale[56], and the Questionnaire Measure of Emotional Empathy[57]; renowned early measures of empathy that were not used in current research and did not appear in our extensive search.

***Study characteristics***

Forty-seven primary studies were identified for final analysis, of which 16 were aimed at presenting or validating original questionnaires (Table 1). The sample size ranged from 109 to 2612, and the age range of participants included children and adolescents from 1 to 18 years; participants’ gender varied from 46.3% to 100% male. Most study samples included healthy subjects recruited from communities, households, schools, centers and hospitals, except for one study performed only on antisocial convicts recruited from rehabilitation services, and two studies conducted also on patients, recruited from clinical centers, with conduct disorder and ASD, respectively, compared to healthy subjects.

Further characteristics of included studies aimed at validating novel versions or adaptations (*n* = 6) and translations into different languages (*n* = 19), or aimed at further evaluating psychometric properties of validated measures (*n* = 6), are shown in Table 2. Included studies were conducted in European, American and Asian countries, with translations into 11 languages (Basque, Bengali, Chinese, Dutch, French, Italian, Korean, Portuguese, Slovak, Spanish and Turkish). Adaptations included short versions of the original questionnaires and child parent-reported versions of adolescents self-reported measures. Most studies also evaluated the psychometric properties of the measurements, including validity and reliability. The sample size ranged from 51 to 2714.

***Measures of empathy***

A total of 16 measures were used to assess the construct of empathy in children and adolescents (Table 3). Further details on each measure are provided in Supplementary Materials.

***Psychometric properties and validation samples***

All measures consisted in Likert scales with number of items and responses varying for each questionnaire, mainly ranging between 12 and 30, with the Dispositional Positive Empathy Scale (DPES) and the Empathy Scale derived from the Psychopathic Personality Inventory (ES-PPI) presenting a relatively low number of items, respectively including seven and five items. Reliability assessments (mainly using Cronbach’s α) were available for most measures. Original validations of the measures showed questionable to excellent levels of internal consistency, with α values ranging from about 0.54 to 0.93. The lowest levels were found for the F&T and the Bryant’s Empathy Index (BEI) questionnaires, while the Empathy Quotient for Children (EQ-C) demonstrated the highest internal consistency. Test–retest and other reliability measures were uncommon. Good test–retest indexes were found for the BEI and EQ-C scales, while lower levels of reliability were identified for the GEM, Children’s Empathic Attitudes Questionnaire (CEAQ) and Adolescents’ Measure of Empathy and Sympathy (AMES). Several types of validity assessments were also available. Questionably, criterion validity was mainly based on the finding of higher empathic skills in women than in men. Additionally, the Scale to Measure Empathy (SME) was tested on patients with CD, who showed higher scores than healthy controls, whereas, in the EQ-C, typical individual scored the highest, followed by ASD children who scored the lowest. Convergent and divergent validity was tested by means of several measures, which can hardly allow direct comparisons of the validated questionnaires. Finally, it should be emphasized that, for the ES-PPI scale, content validity appeared questionable; indeed, all its five items could be easily interpreted as related to separation anxiety and interpersonal sensitivity.

As for the type of report, five measures were based on a parental report, while the other 11 were self-reported. Nonetheless, the BES questionnaire, originally developed as a self-report measure for adolescents[6], was also adapted in a parent-report form[58]. The Empathy and theory of mind scale (EToMS), EQ and DPES scales were specifically validated in infants and preschool children, while the SME, BES and ES-PPI measures were originally targeted to adolescents, although the EQ was also adapted for school-aged children and adolescents[59] and the BES for children[60]. No *a priori* restriction was applied to exclude teacher-reported questionnaires; however, no such measure was identified through our search. It is worthwhile noting that the GEM was also previously used for teacher report[61], as well as the abovementioned Infant-Toddler Social and Emotional Assessment questionnaire[62].

Noteworthy, the SME and the EQ-C were originally validated in clinical population of adolescents with CD[63] and children with ASD[64], respectively. In addition, the BEI and the IRI, two of the most widely used scales for empathy, already found a clinical application in the assessment of empathic skills in autism[65,66], conduct disorders[12] and psychopathic traits[67-69]. Similarly, the GEM has already been used to examine empathy deficits in children with ASD[65], externalizing symptoms with aggressive behavior[61,70], and callous–unemotional traits[71], while the BES has been used in delinquents and institutionalized youths with conduct disorders[72-74]. Those latter three questionnaires also profit from many translations in several languages.

**DISCUSSION**

***Constructs and dimensions: bipartite models***

Six measures were monodimensional, while the other 10 appeared to be multidimensional, with variable internal factors. The commonest structure consisted in the combination of the two main components of empathy, namely the affective and cognitive subdivisions, which appear in the F&T, BES and GEM questionnaires. Indeed, most researchers agree on the multidimensionality of the construct of empathy which includes (at least) two main dissociable components[75]. Affective empathy refers to the response to the emotional displays of others, *e.g.*, their facial and vocal expressions and body movements, or to the verbal expression of stimuli with emotional valence[76]. It allows one to automatically relate to other people’s emotional states, which is essential for the regulation of social interactions, coordinated activity, and cooperation toward shared goals[24]. Cognitive empathy, instead, refers to the capacity to comprehend another person’s emotions, thus leading to the representation of the internal emotional experience of the other[24,76]. Based on the bipartite model of empathy, it has been hypothesized[5,77,78] that a deficit in a specific component relate to a specific neurobehavioral disorder; particularly, cognitive empathy would be specifically affected in ASD, while the affective domain would pertain conduct disorders, especially with callous–unemotional traits, and aggressive behaviors. In his fundamental paper, Blair[5] advocates that “fine cuts” between cognitive and emotional empathy are needed for a better understanding of amygdala dysfunction in psychopathy and autism. More speculatively, Smith[78] identified four main empathy disorders in abnormal developmental circumstances, predicting the existence of two empathy imbalance disorders and two general empathy disorders. The formers include the cognitive empathy deficit disorder (CEDD), consisting of low cognitive ability but high affective sensitivity, and the emotional empathy deficit disorder (EEDD), consisting of low affective sensitivity but high cognitive ability. The latter includes the general empathy deficit disorder (GEDD), consisting of low ability and low affectivesensitivity, and the general empathy surfeit disorder (GESD), consisting of high cognitive ability and high affective sensitivity. Specifically, CEDD and EEDD respectively reflect the empathic profiles of autism and psychopathy, while GEDD and GESD that of schizoid personality and Williams syndrome. However, a meta-analysis[79] that confirmed the relationship between empathy deficits and criminal offending found a stronger effect for cognitive empathy deficits than for affective empathy. On the contrary, a review of affective empathy deficits in aggressive adolescents underlined the importance of this latter component of empathy[80].Questionnaires, such as F&T, BES and GEM, that differentiate between these two components of empathy, could be best applied to the clinical assessment of such conditions in order to confirm or confute those hypotheses.

***Hoffman’s developmental model-based measures***

Among bipartite measures, GEM was largely based on developmental stages of empathic skills proposed by Hoffman[75]. Similarly, both EQ and CEAQ were based on Hoffman’s developmental model. While the former actually derives its three subscales from Hoffman’s first stages of empathic responses development (*i.e.*, Emotion Contagion, Attention to Others’ Feelings, Prosocial Actions), the latter has been validated according to the Rasch model and could thus be considered a unidimensional measure, where subjects and items are placed on the same metric scale: children can be, thus, placed along an “empathy development ruler” to quantify their likelihood of achieving different milestones.

Given its impact on empathy measures, Hoffman’s developmental model merits further discussion. According to Hoffman[75], during development empathic responses progressively emerge to reach their final expression in adolescence. He distinguished four levels of empathy, which are believed to develop sequentially[20], although they are not mutually exclusive and, according to de Waal[24], follow one each other to build onto the former levels. the first level is labeled as global empathy or emotion contagion and manifests itself as early as age 18–72 h and throughout the first year. At this level, newborns attend to others’ emotions, although nonadaptively, since witnessing someone in distress may result in a similar affective response[81]. In other words, the theory assumes that humans are congenitally hardwired to automatically imitate and synchronize affective expressions, but infants cannot yet differentiate between self and other, which causes them to act as though what happened to the other person happened to them[20]. Furthermore, infants still have difficulties to control their level of arousal, and the ability for self-regulation is negatively associated with symptoms of emotion contagion[82]. The second level, that can be labeled as attention to others’ feelings[83], starts after 1 year of age, and persists during the second year of life. At this level, self-other differentiation, perspective-taking, and emotional regulation gradually develop, and infants become aware that although they feel distressed, it is not oneself but someone else who is in actual danger or pain. Other people’s emotions can be thus observed with less personal distress[82]. At the third level, by 2 years of age, concern for others may lead the child to react prosocially (prosocial actions)[83]. During the third year of life, children develop this capacity to intervene on behalf of others; this may take a variety of forms, including helping, sharing, and comforting. Later on, children acquire further social competences, that are frequently used as indicators of the development of a theory of mind (ToM), and progressively develop more effective helping strategies[20]. The fourth level in Hoffman’s theory, that is empathy for another’s life condition’[83], develops during late childhood. It refers to empathic responses, which are not only confined to the situation, but also with another’s general level of distress or deprivation. This empathic level may motivate the child and adolescent to feel empathy for people who live in more unfavorable circumstances, and eventually support them by prosocial behaviors (*i.e.*, donating money to charity funds)[82].

Building on Hoffman’s model, Decety and Jackson[25] developed a multidimensional model of empathy in children, on which EQ has been based. In particular, the attention to others’ feelings stage proposed by Hoffman[20] is further split in the three components of self-awareness, perspective taking and emotion regulation. Self-awareness requires the child to simultaneously reflect on his feelings and suspend his own experience to evoke the thoughts and feelings of others. This skill is a prerequisite for perspective taking which requires the other to be perceived as different from oneself and yet to be put in one’s place. Emotional regulation finally implies the ability for cognitive reappraisal of emotional stimuli in order to change one’s own affect. Five subscales of EQ have been built accordingly, namely emotion contagion, self-awareness, perspective taking, emotional regulation and empathic action.

***Constructs and dimensions: other multidimensional measures***

More recent instruments address new facets of empathy, such as the somatic component, or related constructs, such as sympathy, which might integrate further complexity to the original bipartite model and provide new insights in the understanding of psychological faults in the aforementioned disorders. In particular, the AMES includes a sympathy subscale. While previous empathy scales equate affective empathy with sympathy (*e.g.*, IRI), this validated measure was purposefully intended to distinguish between empathy and sympathy. In this scale, the constructs of affective empathy, cognitive empathy and sympathy were respectively based on the definitions proposed by Mehrabian and Epstein[57] (experience of another person’s emotion), Hogan[56] (understanding of another person’s emotion) and Clark[84] (feeling concern or sorrow for another person’s distress). Thus, affective empathy and sympathy are both conceived as emotional reactions to the perceived emotions of another person; however, in the case of empathy, the emotion is the same as the emotion of the other person (emotion congruence), whereas with sympathy, individuals experience feelings of concern and sorrow about distressful events in another person’s life. A third dissociable component, somatic or motor empathy, as defined by Blair[76], can be identified using the Cognitive, Affective and Somatic Empathy Scale (CASES). According to Blair[76], somatic empathy occurs when the individual mirrors the motor responses of an observed actor, as described in the perception–action model of empathy[23]. Somatic empathy is thus conceptualized as more automatic than both affective and cognitive components and consists of a primitive form based on mirror neuron system. In other words, the perception of another person experiencing a specific emotion will elicit a motor act or a somatic body response[29]. Notably, the CASES has been recently applied to capture the multifaceted nature of empathy in the different forms of aggression[85]. In addition, affective, cognitive and somatic empathy could be further distinguished into positive and negative forms, based on CASES subscales[29]. As opposed to negative empathy, positive empathy represents the expression of happiness or joy that results from comprehending another person’s positive emotional state or condition. While CASES subscales could be subdivided in positive and negative components of empathy, Cognitive and Affective Empathy Scale (Test de Empatia Cognitiva y Afectiva; TECA) provide a specific subscale for Empathic Joy and DPES was primarily intended to assess positive empathy in children.

Finally, two facets of ToM, *i.e.*, nice and nasty ToM, are considered in the EToMS. ToM refers to the ability to represent the mental states of others[86]. Whether this concept overlaps with that of the cognitive empathy is still under debate. Indeed, both are perspective-taking capacities that are essential in maintaining a functional social relationship. ToM appears to concern the understanding of epistemic mental states such as knowledge and belief, as well as motivational mental states such as desire and emotion, and their consequences on people’s behavior, thus possibly including in itself the concept of cognitive empathy[86]. Alternatively, ToM might be limited to the understanding of the intentionality implied by propositional attitudes, while empathy is linked to emotional connectedness and physiological arousal[87]. The distinction between these nice and nasty components captures the essence of the diverse nature of the social consequences of ToM depending on temperament and social goals. Nice ToM behaviors include cooperating, comforting, and considering feelings of others, while Nasty ToM behaviors include teasing, lying, cheating, and blaming.

***Research and clinical applications***

Given non-negligible differences in structure and validity between previously described instruments, the selection of questionnaires for research and clinical applications should be tailored to specific needs, depending on setting, goals and characteristics of the studied population.

Older scales, such as the BEI, IRI and BES, benefit from a longer tradition and a wider diffusion with respect to more recent instruments and are preferable in clinical settings. Importantly, the BEI and the IRI are self-report questionnaires validated in English for both children and adolescents and in Spanish for adolescents, while the BES has been validated in several European languages, but also in Chinese and Korean. It is noteworthy that the IRI has been used as reference measure for concurrent validity of four other questionnaires[35,83,88], including the BES[6]. In addition, the F&T has been developed as a modified version of the IRI[89]. Both the IRI and BES have been used in ADHD patients, with or without comorbid conditions such as ASD or disruptive behavior disorders[90]. In this context, they showed significant associations with executive functioning[90]. Interestingly, the IRI has also been used to unravel cognitive empathy deficits in adolescents with anorexia[17]. Several other associations between empathy and psychopathological dimensions, including psychopathy, conduct problems and internalizing symptoms such as anxiety and depression, have been revealed using BES in large samples of adolescent inpatients[91-93]. Finally, the BEI has been found to differentiate between children with conduct disorders and controls[68] and has been associated with conduct problems in children and adolescents with ADHD[13].

Despite their advantages, all these measures are self-reported, which may represent a major limitation when patients with ASD or disruptive behavior disorders are assessed. The GEM could represent a valuable option in this respect. Indeed, the GEM has been developed from the BEI as a parent-report scale for both children and adolescents. For instance, the GEM proved useful in differentiating adolescents with and without ASD, whose BEI scores did not differ[65], and children with and without disruptive behavior disorders based on teacher reports[94]. Importantly, the GEM significantly predicted proactive aggression after 1 year in a prospective study of 6- and 7-year-old children[61]. Another useful parent-report instrument, freely available in several languages, is the EQ-C, that has been validated in preschool children, children and adolescents with and without ASD[64,95]. Discrepancies between parent- and self-reports of empathy have been observed in ASD adolescents using this measure: patients were found to report more empathic features than their parents attributed to them[96]. Further to its focus on autistic traits, EQ-C has also been associated with peer-rated aggression in children[97]. More studies using EQ-C in non-ASD samples are, thus, justified.

Several among the other scales warrant further investigations. Some of the more recently developed instruments, for example, have the advantage to explore newer conceptualizations of interest in research settings. The AMES include a subscale dedicated to sympathy construct, while somatic empathy measurement could be specifically addressed only by CASES. Interestingly, the EQ strictly follows the developmental staging model proposed by Hoffman[20], while the CEAQ has been validated according to the Rasch model and constitute a “developmental ruler” based on Hoffman’s stages. Finally, the EQ, who is also based on Hoffman, is the only available instrument validated in infants, preschool children, children and adolescents.

**CONCLUSION**

Different measures of empathy have been developed and validated in children and adolescents. Even though construct definitions only partially overlap, affective and cognitive domains are commonly evaluated through separate subscales. Many of these instruments constitute extremely useful clinical tools for evaluating impairments in empathic competences and social skills within neurodevelopmental disorders and psychiatric conditions. However, the choice of the measure to use should clearly vary, depending on the setting and the object of study, and the combination of different assessment methods is recommended in order to foresee further improvements in this field and try to overcome the problem of limited convergence of rating scales with more objective measures. Finally, factor-analytic studies exploring the structure of empathy based on different questionnaires, combined with each other, are warranted, especially in the developmental age, in order to test different conceptualizations of empathy, and to unravel significant non-overlapping facets of the construct.

**ARTICLE HIGHLIGHTS**

***Research background***

Empathy deficits significantly contribute to developmental psychopathology. Questionnaires are the most used tools for the assessment of empathy both in adults and in children and adolescents.

***Research motivation***

No comprehensive overview of validated questionnaires for measuring empathy was available for clinicians and researchers in the neurodevelopmental field.

***Research objectives***

We aimed to identify and describe empirically validated questionnaires assessing empathy in children and adolescents and to provide a summary of related theoretical perspectives on empathy definitional issues.

***Research methods***

A systematic review of the literature was conducted according to PRISMA guidelines.

***Research results***

We identified and described 16 measures used to assess empathy in children and adolescents. Most measures were multidimensional. Several instruments were based on a bipartite model of empathy, with dissociable affective and cognitive components. Other tools were built on Hoffman’s developmental model or included new facets, such as sympathy or somatic empathy.

***Research conclusions***

Different scales are suitable in varying research and clinical settings, depending on the object of study, the clinical population, the age range and the models of interest. The combination of different assessment methods is recommended.

***Research perspectives***

Future studies shall focus on directly comparing psychometric properties and factor-structure of different empathy questionnaires in multiple clinical and community samples.

**REFERENCES**

1 **Listowel EO.** A Critical History of Modern Aesthetics. 1st ed. London: Routledge. 2016 [DOI: 10.4324/9781315618418]

2 **Titchener EB.** Lectures on the experimental psychology of the thought-processes. New York: MacMillan Co; 1909 [DOI: 10.1037/10877-000]

3 **Neumann M**, Scheffer C, Längler A, Tauschel D, Joos S, Lutz G, Edelhäuser F. [Relevance and barriers of physician empathy in daily practice - current state of research and qualitative survey of physicians]. *Rehabilitation (Stuttg)* 2010; **49**: 326-337 [PMID: 20963674 DOI: 10.1055/s-0030-1263159]

4 **Kane MJ**, White HMJ. Empathy for those working in other disciplines. *BMJ* 2020; **371**: m4549 [PMID: 33243753 DOI: 10.1136/bmj.m4549]

5 **Blair RJ**. Fine cuts of empathy and the amygdala: dissociable deficits in psychopathy and autism. *Q J Exp Psychol (Hove)* 2008; **61**: 157-170 [PMID: 18038346 DOI: 10.1080/17470210701508855]

6 **Jolliffe D**, Farrington DP. Development and validation of the Basic Empathy Scale. *J Adolesc* 2006; **29**: 589-611 [PMID: 16198409 DOI: 10.1016/j.adolescence.2005.08.010]

7 **Milone A**, Cerniglia L, Cristofani C, Inguaggiato E, Levantini V, Masi G, Paciello M, Simone F, Muratori P. Empathy in Youths with Conduct Disorder and Callous-Unemotional Traits. *Neural Plast* 2019; **2019**: 9638973 [PMID: 31097957 DOI: 10.1155/2019/9638973]

8 **Sethi A**, O'Nions E, McCrory E, Bird G, Viding E. An fMRI investigation of empathic processing in boys with conduct problems and varying levels of callous-unemotional traits. *Neuroimage Clin* 2018; **18**: 298-304 [PMID: 29876250 DOI: 10.1016/j.nicl.2018.01.027]

9 **Zych I**, Ttofi MM, Farrington DP. Empathy and Callous-Unemotional Traits in Different Bullying Roles: A Systematic Review and Meta-Analysis. *Trauma Violence Abuse* 2019; **20**: 3-21 [PMID: 30803395 DOI: 10.1177/1524838016683456]

10 **Vellante M**, Baron-Cohen S, Melis M, Marrone M, Petretto DR, Masala C, Preti A. The "Reading the Mind in the Eyes" test: systematic review of psychometric properties and a validation study in Italy. *Cogn Neuropsychiatry* 2013; **18**: 326-354 [PMID: 23106125 DOI: 10.1080/13546805.2012.721728]

11 **Preti A**, Vellante M, Baron-Cohen S, Zucca G, Petretto DR, Masala C. The Empathy Quotient: a cross-cultural comparison of the Italian version. *Cogn Neuropsychiatry* 2011; **16**: 50-70 [PMID: 20737328 DOI: 10.1080/13546801003790982]

12 **Schwenck C**, Schmitt D, Sievers S, Romanos M, Warnke A, Schneider W. [Cognitive and emotional empathy in children with ADHD and conduct disorder]. *Z Kinder Jugendpsychiatr Psychother* 2011; **39**: 265-276 [PMID: 21667451 DOI: 10.1024/1422-4917/a000118]

13 **Gumustas F**, Yilmaz I, Yulaf Y, Gokce S, Sabuncuoglu O. Empathy and Facial Expression Recognition in Children With and Without Attention-Deficit/Hyperactivity Disorder: Effects of Stimulant Medication on Empathic Skills in Children with Attention-Deficit/Hyperactivity Disorder. *J Child Adolesc Psychopharmacol* 2017; **27**: 433-439 [PMID: 28332851 DOI: 10.1089/cap.2016.0052]

14 **Maoz H**, Gvirts HZ, Sheffer M, Bloch Y. Theory of Mind and Empathy in Children With ADHD. *J Atten Disord* 2019; **23**: 1331-1338 [PMID: 28558473 DOI: 10.1177/1087054717710766]

15 **Rüfenacht E**, Euler S, Prada P, Nicastro R, Dieben K, Hasler R, Pham E, Perroud N, Weibel S. Emotion dysregulation in adults suffering from attention deficit hyperactivity disorder (ADHD), a comparison with borderline personality disorder (BPD). *Borderline Personal Disord Emot Dysregul* 2019; **6**: 11 [PMID: 31360522 DOI: 10.1186/s40479-019-0108-1]

16 **Kerr-Gaffney J**, Harrison A, Tchanturia K. Cognitive and Affective Empathy in Eating Disorders: A Systematic Review and Meta-Analysis. *Front Psychiatry* 2019; **10**: 102 [PMID: 30886590 DOI: 10.3389/fpsyt.2019.00102]

17 **Calderoni S**, Fantozzi P, Maestro S, Brunori E, Narzisi A, Balboni G, Muratori F. Selective cognitive empathy deficit in adolescents with restrictive anorexia nervosa. *Neuropsychiatr Dis Treat* 2013; **9**: 1583-1589 [PMID: 24204149 DOI: 10.2147/NDT.S50214]

18 **Batista M**, Žigić Antić L, Žaja O, Jakovina T, Begovac I. Predictors of eating disorder risk in anorexia nervosa adolescents. *Acta Clin Croat* 2018; **57**: 399-410 [PMID: 31168171 DOI: 10.20471/acc.2018.57.03.01]

19 **Batson CD.** These Things Called Empathy: Eight Related but Distinct Phenomena. In: The Social Neuroscience of Empathy. The MIT Press 2009; 3-16 [DOI: 10.7551/mitpress/9780262012973.003.0002]

20 **Hoffman ML.** The contribution of empathy to justice and moral judgment. *Cambridge Stud Soc Emot Dev* 1987; 47-80 [DOI: 10.7551/mitpress/5782.003.0038]

21 **Deutsch F**, Madle RA. Empathy: historic and current conceptualizations, measurement, and a cognitive theoretical perspective. *Hum Dev* 1975; **18**: 267-287 [PMID: 765261 DOI: 10.1159/000271488]

22 **Eisenberg N,** Fabes RA. Empathy: Conceptualization, measurement, and relation to prosocial behavior. *Motiv Emot* 1990; **14**: 131-149 [DOI:10.1007/bf00991640]

23 **Preston SD**, de Waal FB. Empathy: Its ultimate and proximate bases. *Behav Brain Sci* 2002; **25**: 1-20; discussion 20-71 [PMID: 12625087 DOI: 10.1017/s0140525x02000018]

24 **de Waal FB**. Putting the altruism back into altruism: the evolution of empathy. *Annu Rev Psychol* 2008; **59**: 279-300 [PMID: 17550343 DOI: 10.1146/annurev.psych.59.103006.093625]

25 **Decety J**, Jackson PL. The functional architecture of human empathy. *Behav Cogn Neurosci Rev* 2004; **3**: 71-100 [PMID: 15537986 DOI: 10.1177/1534582304267187]

26 **Clark AJ**, Butler CM. Empathy: An Integral Model in Clinical Social Work. *Soc Work* 2020; **65**: 169-177 [PMID: 32266410 DOI: 10.1093/sw/swaa009]

27 **Shamay-Tsoory SG,** Aharon-Peretz J, Perry D. Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus vs ventromedial prefrontal lesions. *Brain* 2009; **132**: 617-627 [PMID: 18971202 DOI:10.1093/brain/awn279]

28 **Shamay-Tsoory SG**. The neural bases for empathy. *Neuroscientist* 2011; **17**: 18-24 [PMID: 21071616 DOI: 10.1177/1073858410379268]

29 **Raine A**, Chen FR. The Cognitive, Affective, and Somatic Empathy Scales (CASES) for Children. *J Clin Child Adolesc Psychol* 2018; **47**: 24-37 [PMID: 28318335 DOI: 10.1080/15374416.2017.1295383]

30 **Dymond RF**. A scale for the measurement of empathic ability. *J Consult Psychol* 1949; **13**: 127-133 [PMID: 18118267 DOI: 10.1037/h0061728]

31 **Chlopan BE,** McCain ML, Carbonell JL, Hagen RL. Empathy: Review of available measures. *J Pers Soc Psychol* 1985; **48**: 635-653 [DOI:10.1037/0022-3514.48.3.635]

32 **Wispé L.** The distinction between sympathy and empathy: To call forth a concept, a word is needed. *J Pers Soc Psychol* 1986; **50**: 314-321 [DOI:10.1037/0022-3514.50.2.314]

33 **Neumann DL,** Chan RCK, Boyle GJ, Wang Y, Rae Westbury H. Measures of Empathy. In: Measures of Personality and Social Psychological Constructs. *Elsevier*; 2015; 257-289 [DOI: 10.1016/B978-0-12-386915-9.00010-3]

34 **Miller PA**, Eisenberg N. The relation of empathy to aggressive and externalizing/antisocial behavior. *Psychol Bull* 1988; **103**: 324-344 [PMID: 3289071 DOI: 10.1037/0033-2909.103.3.324]

35 **Richaud MC**, Lemos VN, Mesurado B, Oros L. Construct Validity and Reliability of a New Spanish Empathy Questionnaire for Children and Early Adolescents. *Front Psychol* 2017; **8**: 979 [PMID: 28659848 DOI: 10.3389/fpsyg.2017.00979]

36 **Decety J**, Michalska KJ, Akitsuki Y. Who caused the pain? An fMRI investigation of empathy and intentionality in children. *Neuropsychologia* 2008; **46**: 2607-2614 [PMID: 18573266 DOI: 10.1016/j.neuropsychologia.2008.05.026]

37 **Lennon R,** Eisenberg N, Carroll J. The relation between nonverbal indices of empathy and preschoolers’ prosocial behavior. *J Appl Dev Psychol* 1986; **7**: 219–224 [DOI:10.1016/0193-3973(86)90030-4]

38 **Piñon M,** Forestier A, Diby M. Empathy deficit in adolescents: how to characterize and evaluate it clinically? A litterature review. *Recherche en soins infirmiers* 2016; **125**: 61-67 [DOI: 10.3917/rsi.125.0061]

39 **Dima AL**. Scale validation in applied health research: tutorial for a 6-step R-based psychometrics protocol. *Health Psychol Behav Med* 2018; **6**: 136-161 [PMID: 34040826 DOI: 10.1080/21642850.2018.1472602]

40 **Moher D**, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009; **6**: e1000097 [PMID: 19621072 DOI: 10.1371/journal.pmed.1000097]

41 **Masi G**, Milone A, Brovedani P, Pisano S, Muratori P. Psychiatric evaluation of youths with Disruptive Behavior Disorders and psychopathic traits: A critical review of assessment measures. *Neurosci Biobehav Rev* 2018; **91**: 21-33 [PMID: 27677830 DOI: 10.1016/j.neubiorev.2016.09.023]

42 **Poresky RH**. The Young Children's Empathy Measure: reliability, validity and effects of companion animal bonding. *Psychol Rep* 1990; **66**: 931-936 [PMID: 2377714 DOI: 10.2466/pr0.1990.66.3.931]

43 **Happ C,** Pfetsch J. Media-Based Empathy (MBE)-development of an instrument to assess empathic reactions when using media [Medienbasierte Empathie (MBE): Entwicklung eines Instruments zur Erfassung empathischer Reaktionen bei Mediennutzung]. *Diagnostica* 2016; **62**: 110-125 [DOI:10.1026/0012-1924/a000152]

44 **Kaya A,** Siyez DM. Child and adolescent KA-SI empathic tendency scale: Development, validity and reliability study. *Nesne Psikoloji Dergisi* 2018; **6**: 144-173 [DOI: 10.7816/nesne-06-12-08]

45 **Şahin E,** Topkaya N. Confirmatory factor analysis of the Ka-Si empathic tendency scale adolescent form in religious high school students. *Turkish Online J Educ Technol* 2016; **2016**: 519–523 [DOI:10.1177/0033294116644093]

46 Dyck MJ. The Ability to Understand the Experience of Other People: Development and Validation of the Emotion Recognition Scales. *Aust Psychol* 2012; **47**: 49–57 [DOI:10.1111/j.1742-9544.2011.00047.x]

47 **Peña Fernández ME**, Andreu Rodríguez JM, Barriga Á, Gibbs J. Psychometrical properties of the "How I Think" Questionnaire (HIT-Q) in adolescents. *Psicothema* 2013; **25**: 542-548 [PMID: 24124790 DOI: 10.7334/psicothema2013.38]

48 **Fujiwara T,** Murakami T, Nishimura T, Hamaguchi Y, Sakurai S. Development of an interpersonal gratitude scale for children. *Japanese J Educ Psychol* 2014; **62**: 187-196 [DOI:10.5926/jjep.62.187]

49 **Briggs-Gowan MJ,** Carter AS. Preliminary acceptability and psychometrics of the Infant-Toddler Social and Emotional Assessment (ITSEA): A new adult-report questionnaire. *Infant Ment Health J* 1998; **19**: 422-445 [DOI: 10.1002/(SICI)1097-0355(199824)19:4<422::AID-IMHJ5>3.0.CO;2-U]

50 **Yu J**, Kirk M. Measurement of empathy in nursing research: systematic review. *J Adv Nurs* 2008; **64**: 440-454 [PMID: 19146512 DOI: 10.1111/j.1365-2648.2008.04831.x]

51 **Magotsiou E**, Goudas M, Hasandra M. Validity and reliability of the Greek version of the Multisource Assessment of Social Competence Scale. *Percept Mot Skills* 2006; **103**: 667-675 [PMID: 17326487 DOI: 10.2466/pms.103.3.667-675]

52 **Lai FHY,** Siu AMH, Chan CCH, Shek DTL. Measurement of Prosocial Reasoning among Chinese Adolescents. *Sci World J* 2012 [DOI:10.1100/2012/174845]

53 **Sutton E,** Schonert-Reichl KA, Wu AD, Lawlor MS. Evaluating the Reliability and Validity of the Self-Compassion Scale Short Form Adapted for Children Ages 8-12. *Child Indic Res* 2018; **11**: 1217-1236 [DOI:10.1007/s12187-017-9470-y]

54 **Nishimura H**, Komaki G, Igarashi T, Moriguchi Y, Kajiwara S, Akasaka T. Validity issues in the assessment of alexithymia related to the developmental stages of emotional cognition and language. *Biopsychosoc Med* 2009; **3**: 12 [PMID: 19886981 DOI: 10.1186/1751-0759-3-12]

55 **Caci H**, Nadalet L, Baylé FJ, Robert P, Boyer P. Cross-cultural study of the Impulsiveness-Venturesomeness-Empathy Questionnaire (IVE-7). *Compr Psychiatry* 2003; **44**: 381-387 [PMID: 14505298 DOI: 10.1016/S0010-440X(03)00105-6]

56 **Hogan R**. Development of an empathy scale. *J Consult Clin Psychol* 1969; **33**: 307-316 [PMID: 4389335 DOI: 10.1037/h0027580]

57 **Mehrabian A,** Epstein N. A measure of emotional empathy1. *J Pers* 1972; **40**: 525–543 [DOI: 10.1111/j.1467-6494.1972.tb00078.x]

58 **Sánchez-Pérez N**, Fuentes LJ, Jolliffe D, González-Salinas C. Assessing children's empathy through a Spanish adaptation of the Basic Empathy Scale: parent's and child's report forms. *Front Psychol* 2014; **5**: 1438 [PMID: 25566121 DOI: 10.3389/fpsyg.2014.01438]

59 **Overgaauw S**, Rieffe C, Broekhof E, Crone EA, Güroğlu B. Assessing Empathy across Childhood and Adolescence: Validation of the Empathy Questionnaire for Children and Adolescents (EmQue-CA). *Front Psychol* 2017; **8**: 870 [PMID: 28611713 DOI: 10.3389/fpsyg.2017.00870]

60 **Bensalah L**, Stefaniak N, Carre A, Besche-Richard C. The Basic Empathy Scale adapted to French middle childhood: Structure and development of empathy. *Behav Res Methods* 2016; **48**: 1410-1420 [PMID: 26424437 DOI: 10.3758/s13428-015-0650-8]

61 **Deschamps PK**, Verhulp EE, de Castro BO, Matthys W. Proactive aggression in early school-aged children with externalizing behavior problems: A longitudinal study on the influence of empathy in response to distress. *Am J Orthopsychiatry* 2018; **88**: 346-353 [PMID: 29469585 DOI: 10.1037/ort0000319]

62 **Sallquist J**, Eisenberg N, Spinrad TL, Eggum ND, Gaertner BM. Assessment of preschoolers' positive empathy: concurrent and longitudinal relations with positive emotion, social competence, and sympathy. *J Posit Psychol* 2009; **4**: 223-233 [PMID: 20011674 DOI: 10.1080/17439760902819444]

63 **Rey C.** The measurement of empathy in Male pre-adolescents and adolescents. Adaptation and validation of a scale [DOI: 10.26226/morressier.5885d712d462b8028d892185]

64 **Auyeung B**, Wheelwright S, Allison C, Atkinson M, Samarawickrema N, Baron-Cohen S. The children's Empathy Quotient and Systemizing Quotient: sex differences in typical development and in autism spectrum conditions. *J Autism Dev Disord* 2009; **39**: 1509-1521 [PMID: 19533317 DOI: 10.1007/s10803-009-0772-x]

65 **Greimel E**, Schulte-Rüther M, Kamp-Becker I, Remschmidt H, Herpertz-Dahlmann B, Konrad K. [Self-report and parental report of empathy in adolescents with autism]. *Z Kinder Jugendpsychiatr Psychother* 2011; **39**: 113-121 [PMID: 21442599 DOI: 10.1024/1422-4917/a000097]

66 **Lin IF,** Kashino M, Ohta H, Yamada T, Tani M, Watanabe H, Kanai C, Ohno T, Takayama Y, Iwanami A, Kato N. The effect of intranasal oxytocin vs placebo treatment on the autonomic responses to human sounds in autism: a single-blind, randomized, placebo-controlled, crossover design study. *Mol Autism* 2014; **5**: 20 [PMID: 24576333 DOI:10.1186/2040-2392-5-20]

67 **Lethbridge EM**, Richardson P, Reidy L, Taroyan NA. Exploring the Relationship Between Callous-Unemotional Traits, Empathy Processing and Affective Valence in a General Population. *Eur J Psychol* 2017; **13**: 162-172 [PMID: 28344681 DOI: 10.5964/ejop.v13i1.1179]

68 **Anastassiou-Hadjicharalambous X**, Warden D. Physiologically-indexed and self-perceived affective empathy in Conduct-Disordered children high and low on Callous-Unemotional traits. *Child Psychiatry Hum Dev* 2008; **39**: 503-517 [PMID: 18792777 DOI: 10.1007/s10578-008-0104-y]

69 **Schiffer B**, Pawliczek C, Müller BW, Wiltfang J, Brüne M, Forsting M, Gizewski ER, Leygraf N, Hodgins S. Neural Mechanisms Underlying Affective Theory of Mind in Violent Antisocial Personality Disorder and/or Schizophrenia. *Schizophr Bull* 2017; **43**: 1229-1239 [PMID: 28199713 DOI: 10.1093/schbul/sbx012]

70 **Malcolm-Smith S**, Woolley D, Ward CL. Examining empathy and its association with aggression in young Western Cape children. *J Child Adolesc Ment Health* 2015; **27**: 135-147 [PMID: 26357919 DOI: 10.2989/17280583.2015.1085386]

71 **Hartman C**, Hageman T, Williams JH, Mary JS, Ascione FR. Exploring Empathy and Callous-Unemotional Traits as Predictors of Animal Abuse Perpetrated by Children Exposed to Intimate Partner Violence. *J Interpers Violence* 2019; **34**: 2419-2437 [PMID: 27456532 DOI: 10.1177/0886260516660971]

72 **Pechorro P**, Kahn RE, Abrunhosa Gonçalves R, Ray JV. Psychometric properties of Basic Empathy Scale among female juvenile delinquents and school youths. *Int J Law Psychiatry* 2017; **55**: 29-36 [PMID: 29157509 DOI: 10.1016/j.ijlp.2017.10.008]

73 **Nunes C**, Ayala-Nunes L, Pechorro P, La Greca AM. Short Form of the Social Anxiety Scale for Adolescents among community and institutionalized Portuguese youths. *Int J Clin Health Psychol* 2018; **18**: 273-282 [PMID: 30487933 DOI: 10.1016/j.ijchp.2018.06.001]

74 **Euler F**, Steinlin C, Stadler C. Distinct profiles of reactive and proactive aggression in adolescents: associations with cognitive and affective empathy. *Child Adolesc Psychiatry Ment Health* 2017; **11**: 1 [PMID: 28077965 DOI: 10.1186/s13034-016-0141-4]

75 Hoffman ML. Prosocial Behavior and Empathy: Developmental Processes. *Int Encycl Soc Behav Sci* 2001; 12230–12233 [DOI:10.1016/b0-08-043076-7/01739-3]

76 **Blair RJ**. Responding to the emotions of others: dissociating forms of empathy through the study of typical and psychiatric populations. *Conscious Cogn* 2005; **14**: 698-718 [PMID: 16157488 DOI: 10.1016/j.concog.2005.06.004]

77 **Decety J**. The neuroevolution of empathy. *Ann N Y Acad Sci* 2011; **1231**: 35-45 [PMID: 21651564 DOI: 10.1111/j.1749-6632.2011.06027.x]

78 Smith A. Cognitive Empathy and Emotional Empathy in Human Behavior and Evolution. *Psychol Rec* 2006; **56**: 3-21 [DOI: 10.1007/bf03395534]

79 **Jolliffe D,** Farrington DP. Empathy and offending: A systematic review and meta-analysis. *Aggress Violent Behav* 2004; **9**: 441-476 [DOI: 10.1016/j.avb.2003.03.001]

80 **Lovett BJ**, Sheffield RA. Affective empathy deficits in aggressive children and adolescents: a critical review. *Clin Psychol Rev* 2007; **27**: 1-13 [PMID: 16697094 DOI: 10.1016/j.cpr.2006.03.003]

81 **Rieffe C**, Camodeca M. Empathy in adolescence: Relations with emotion awareness and social roles. *Br J Dev Psychol* 2016; **34**: 340-353 [PMID: 26778274 DOI: 10.1111/bjdp.12133]

82 **Funk J,** Fox C, Chan M, Curtiss K. The development of the Children’s Empathic Attitudes Questionnaire using classical and Rasch analyses. *J Appl Dev Psychol* 2008; **29**: 187-196 [DOI: 10.1016/j.appdev.2008.02.005]

83 **Rieffe C,** Ketelaar L, Wiefferink CH. Assessing empathy in young children: Construction and validation of an Empathy Questionnaire (EmQue). *Pers Individ Dif* 2010; **49**: 362–367 [DOI: 10.1016/j.paid.2010.03.046]

84 **Clark A**. Empathy and Sympathy: Therapeutic Distinctions in Counseling. *J Ment Heal Couns* 2010; **32**: 95-101 [DOI: 10.17744/mehc.32.2.228n116thw397504]

85 **Chen FR**, Fung ALC, Raine A. The cognitive, affective, and somatic empathy scales (CASES): Cross-cultural replication and specificity to different forms of aggression and victimization. *J Pers Assess* 2021; **103**: 80-91 [PMID: 31633394 DOI: 10.1080/00223891.2019.1677246]

86 **Frith U.** Autism and “Theory of Mind.” In: Gillberg C. Diagnosis and Treatment of Autism. Boston: Springer, 1989; 33-52 [DOI: 10.1007/978-1-4899-0882-7\_4]

87 **Wang Z,** Wang L. The mind and heart of the social child: Developing the empathy and theory of mind scale. *Child Dev Res* 2015; 2015 [DOI:10.1155/2015/171304]

88 **Vossen HGM,** Piotrowski JT, Valkenburg PM. Development of the Adolescent Measure of Empathy and Sympathy (AMES). *Pers Individ Dif* 2015; **74**: 66-71 [DOI: 10.1016/j.paid.2014.09.040]

89 **Garton AF,** Gringart E, Cowan E. The development of a scale to measure empathy in 8-and 9-year-old children 1. 2005

90 **Cristofani C**, Sesso G, Cristofani P, Fantozzi P, Inguaggiato E, Muratori P, Narzisi A, Pfanner C, Pisano S, Polidori L, Ruglioni L, Valente E, Masi G, Milone A. The Role of Executive Functions in the Development of Empathy and Its Association with Externalizing Behaviors in Children with Neurodevelopmental Disorders and Other Psychiatric Comorbidities. *Brain Sci* 2020; **10** [PMID: 32731515 DOI: 10.3390/brainsci10080489]

91 **Gambin M**, Sharp C. The Differential Relations Between Empathy and Internalizing and Externalizing Symptoms in Inpatient Adolescents. *Child Psychiatry Hum Dev* 2016; **47**: 966-974 [PMID: 26792121 DOI: 10.1007/s10578-016-0625-8]

92 **Gambin M**, Sharp C. Relations between empathy and anxiety dimensions in inpatient adolescents. *Anxiety Stress Coping* 2018; **31**: 447-458 [PMID: 29772912 DOI: 10.1080/10615806.2018.1475868]

93 **McLaren V**, Vanwoerden S, Sharp C. The Basic Empathy Scale: Factor structure and validity in a sample of inpatient adolescents. *Psychol Assess* 2019; **31**: 1208-1219 [PMID: 31219279 DOI: 10.1037/pas0000741]

94 **Deschamps PK**, Schutter DJ, Kenemans JL, Matthys W. Empathy and prosocial behavior in response to sadness and distress in 6- to 7-year-olds diagnosed with disruptive behavior disorder and attention-deficit hyperactivity disorder. *Eur Child Adolesc Psychiatry* 2015; **24**: 105-113 [PMID: 24643447 DOI: 10.1007/s00787-014-0535-x]

95 **Auyeung B**, Allison C, Wheelwright S, Baron-Cohen S. Brief report: development of the adolescent empathy and systemizing quotients. *J Autism Dev Disord* 2012; **42**: 2225-2235 [PMID: 22350450 DOI: 10.1007/s10803-012-1454-7]

96 **Johnson SA**, Filliter JH, Murphy RR. Discrepancies between self- and parent-perceptions of autistic traits and empathy in high functioning children and adolescents on the autism spectrum. *J Autism Dev Disord* 2009; **39**: 1706-1714 [PMID: 19626433 DOI: 10.1007/s10803-009-0809-1]

97 **Pascual-Sagastizabal E**, Del Puerto N, Cardas J, Sánchez-Martín JR, Vergara AI, Azurmendi A. Testosterone and cortisol modulate the effects of empathy on aggression in children. *Psychoneuroendocrinology* 2019; **103**: 118-124 [PMID: 30682627 DOI: 10.1016/j.psyneuen.2019.01.014]

98 **Bryant BK**. Index of Empathy for Children and Adolescents [Database record]. APA PsycTests. 1982 [DOI: 10.1037/t01742-000]

99 **Litvack-Miller W**, McDougall D, Romney DM. The structure of empathy during middle childhood and its relationship to prosocial behavior. *Genet Soc Gen Psychol Monogr* 1997; **123**: 303-324 [PMID: 9259121]

100 **Dadds MR**, Hunter K, Hawes DJ, Frost ADJ, Vassallo S, Bunn P, Merz S, El Masry Y. A measure of cognitive and affective empathy in children using parent ratings. *Child Psychiatry Hum Dev* 2008; **39**: 111-122 [DOI:10.1007/s10578-007-0075-4]

101 **Whitt A**, Howard MO. Assessing empathy in antisocial youth: factor analytic and validation findings. *Psychol Rep* 2013; **112**: 325-339 [PMID: 23654045 DOI: 10.2466/16.08.20.PR0.112.1.325-339]

102 **Lopèz-Pèrez B,** Fernadèz I AF. Test de empatia cognitiva y afectiva (TECA). *TEA Ediciones* 2008 [DOI:10.21865/ridep58.1.05]

103 **Merino-Soto C,** Grimaldo-Muchotrigo M. Structural validation of the Basic Empathy Scale modified for adolescents: A preliminary study [Validación estructural de la escala básica de empatía (Basic Empathy Scale) modificada en adolescentes: Un Estudio Preliminar]. *Rev Colomb Psicol* 2015; **24**: 261-270 [DOI: 10.15446/rcp.v24n2.42514]

104 **Pechorro P,** Jesus SN, Kahn RE, Gonçalves RA, Barroso R. The short version of the basic empathy scale among a school sample of Portuguese youths: Validity, reliability and invariance [A Vers{ã}o Breve da Escala de Empatia B{á}sica numa Amostra Escolar de Jovens Portugueses: Validade, Fiabilidade e Invari{â}ncia. *Rev Iberoam Diagnostico y Eval Psicol* 2018; **4**: 157-169 [DOI:10.21865/ridep49.4.13]

105 **Salas-Wright CP**, Olate R, Vaughn MG. Assessing empathy in Salvadoran high-risk and gang-involved adolescents and young adults: a Spanish validation of the basic empathy scale. *Int J Offender Ther Comp Criminol* 2013; **57**: 1393-1416 [PMID: 22859664 DOI: 10.1177/0306624X12455170]

106 **Albiero P**, Matricardi G, Speltri D, Toso D. The assessment of empathy in adolescence: A contribution to the Italian validation of the "Basic Empathy Scale". *J Adolesc* 2009; **32**: 393-408 [PMID: 18691746 DOI: 10.1016/j.adolescence.2008.01.001]

107 **Albiero P,** Matricardi G, Toso D. The Basic Empathy Scale, a measure of empathy in adolescence: A further contribution to the Italian validation [La Basic Empathy Scale, uno strumento per la misura della responsività empatica negli adolescenti: un contributo alla validazione italiana]. *Psicol Clin dello Svilupp* 2010; **14**: 205-218

108 **Čavojová V,** Sirota M, Belovičová Z. Slovak validation of the Basic Empathy Scale in pre-adolescents. *Studia Psychologica* 2012; 54: 195-208 [DOI:10.21909/sp.2014.02.652]

109 **D’Ambrosio F,** Olivier M, Didon D, Besche C. The basic empathy scale: A French validation of a measure of empathy in youth. *Pers Individ Dif* 2009; **46**: 160-165 [DOI: 10.1016/j.paid.2008.09.020]

110 **de Wied M,** Maas C, van Goozen S, Vermande M, Engels R, Meeus W, et al Bryant’s empathy index - A closer examination of its internal structure. *Eur J Psychol Assess* 2007; **23**: 99-104 [DOI:10.1027/1015-5759.23.2.99]

111 **del Barrio V**, Aluja A, García LF. Bryant's Empathy Index for children and adolescents: psychometric properties in the Spanish language. *Psychol Rep* 2004; **95**: 257-262 [PMID: 15460381 DOI: 10.2466/pr0.95.1.257-262]

112 **Geng Y**, Xia D, Qin B. The Basic Empathy Scale: a Chinese validation of a measure of empathy in adolescents. *Child Psychiatry Hum Dev* 2012; **43**: 499-510 [PMID: 22222487 DOI: 10.1007/s10578-011-0278-6]

113 **Soroa G**, Aritzeta A, Balluerka N, Gorostiaga A. Emotional Creativity Inventory--Basque Version (ECI) [Database record]. APA PsycTests. 2016 [DOI: 10.1037/t56131-000]

114 **Grazzani I,** Ornaghi V, Pepe A, Brazzelli E, Rieffe C. The Italian version of the Empathy Questionnaire for 18-to 36-months-old children: psychometric properties and measurement invariance across gender of the EmQue-I13. *Eur J Dev Psychol* 2017; **14**: 118-126 [DOI:10.1080/17405629.2016.1140640]

115 **Hawk ST**, Keijsers L, Branje SJ, Graaff JV, Wied Md, Meeus W. Examining the Interpersonal Reactivity Index (IRI) among early and late adolescents and their mothers. *J Pers Assess* 2013; **95**: 96-106 [PMID: 22731809 DOI: 10.1080/00223891.2012.696080]

116 **Herrera-López M**, Gómez-Ortiz O, Ortega-Ruiz R, Jolliffe D, Romera EM. Suitability of a three-dimensional model to measure empathy and its relationship with social and normative adjustment in Spanish adolescents: a cross-sectional study. *BMJ Open* 2017; **7**: e015347 [PMID: 28951400 DOI: 10.1136/bmjopen-2016-015347]

117 **Liu J**, Qiao X, Dong F, Raine A. The Chinese version of the cognitive, affective, and somatic empathy scale for children: Validation, gender invariance and associated factors. *PLoS One* 2018; **13**: e0195268 [PMID: 29734373 DOI: 10.1371/journal.pone.0195268]

118 **Lucas-Molina B,** Sarmento R, Quintanilla L, Gimenez-Dasi M. The Spanish Version of the Empathy Questionnaire (EmQue): Evidence for Longitudinal Measurement Invariance and Relationship With Emotional Regulation. *EARLY Educ Dev* 2018; **29**: 467-476 [DOI: 10.1080/10409289.2018.1427929]

119 **Pechorro P,** Ray J V, Salas-Wright CP, Maroco J, Goncalves RA. Adaptation of the Basic Empathy Scale among a Portuguese sample of incarcerated juvenile offenders. *Psychol Crime Law* 2015; **21**: 699-714 [DOI: 10.1080/1068316x.2015.1028546]

120 **Péloquin K**, Lafontaine MF. Measuring empathy in couples: validity and reliability of the Interpersonal Reactivity Index for couples. *J Pers Assess* 2010; **92**: 146-157 [PMID: 20155564 DOI: 10.1080/00223890903510399]

121 **Rudra A**, Ram JR, Loucas T, Belmonte MK, Chakrabarti B. Bengali translation and characterisation of four cognitive and trait measures for autism spectrum conditions in India. *Mol Autism* 2016; **7**: 50 [PMID: 27980709 DOI: 10.1186/s13229-016-0111-y]

122 **Vilte LS,** Moreno JE, Castillo-Gualda R, Lecuona O, Garcia-Rubio C, Rodriguez-Carvajal R. Psychometric properties of the spanish validation of the Children’s Empathic Attitudes Questionnaire (CEAQ). *Psychom Methodol Appl Psychol* 2016; **23**: 365-376

123 **You S,** Lee J, Lee Y. Validation of Basic Empathy Scale: Exploring a Korean Version. *Curr Psychol* 2018; **37**: 726-730 [DOI:10.1007/s12144-016-9554-8]

124 **Zengin H,** Yalnizoğlu Çaka S, Çinar N. Adaptation of the adolescent measure of empathy and sympathy (AMES) to Turkish: A validity and reliability study [Adolesanlarda Empati ve Sempati Kurma Ölçeğinin Türkçe uyarlaması: Geçerlilik ve güvenilirlik çalışması.]. *Anadolu Psikiyatr Derg* 2018; **19**: 184-191 [DOI:10.15659/ankad.v5i1.137]

125 **Anastácio S,** Vagos P, Nobre-Lima L, Rijo D, Jolliffe D. The Portuguese version of the Basic Empathy Scale (BES): Dimensionality and measurement invariance in a community adolescent sample. *Eur J Dev Psychol* 2016; **13**: 614-623 [DOI:10.1080/17405629.2016.1167681]

126 **Carrasco Ortiz MA**, Delgado Egido B, Barbero García MI, Holgado Tello FP, del Barrio Gándara MV. [Psychometric properties of the Interpersonal Reactivity Index in Spanish child and adolescent population]. *Psicothema* 2011; **23**: 824-831 [PMID: 22047879]

127 **Holgado Tello FP**, Delgado Egido B, Carrasco Ortiz MA, Del Barrio Gandara MV. Interpersonal reactivity index: analysis of invariance and gender differences in spanish youths. *Child Psychiatry Hum Dev* 2013; **44**: 320-333 [PMID: 22890826 DOI: 10.1007/s10578-012-0327-9]

128 **Lasa Aristu A**, Holgado Tello FP, Carrasco Ortiz MA, del Barrio Gándara MV. The structure of Bryant's Empathy Index for children: a cross-validation study. *Span J Psychol* 2008; **11**: 670-677 [PMID: 18988452]

129 **Lucas-Molina B**, Pérez-Albéniz A, Giménez-Dasí M, Martín-Seoane G. Bryant's Empathy Index: Structure and Measurement Invariance across Gender in a Sample of Primary School-Aged Children. *Span J Psychol* 2016; **19**: E44 [PMID: 27425402 DOI: 10.1017/sjp.2016.44]

**Footnotes**

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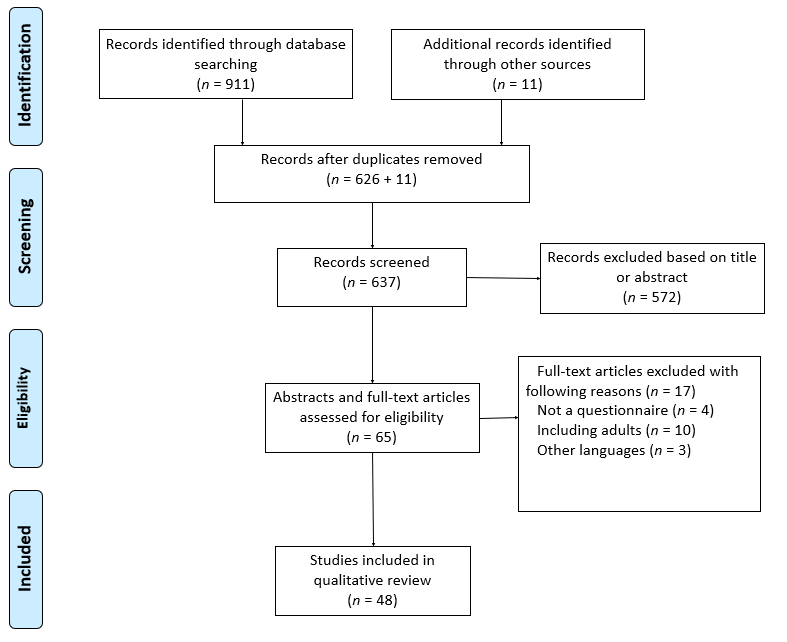
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**Figure Legends**



**Figure 1 PRISMA flowchart.** The process of identification and selection of papers according to PRISMA guidelines is shown in the flowchart. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

**Table 1 Characteristics of included studies aimed at presenting or validating original questionnaires (*n* = 16)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Ref.** | **Measure** | **Country** | **Language** | **Setting** | **Participants** | **Sample size** | **Age, yr** | **Gender** |
| Bryant[98], 1984 | BEI | NA | English | NA | Healthy | 128 + 163 + 73 | 7/10/14 | NA |
| Litvack-Miller *et al*[99], 1997 | IRI | Canada | English | Schools | Healthy | 478 | 7-12 | NA |
| Rey[63], 2003 | SME | Colombia | Spanish | Schools (centers) | Healthy + CD | 224 + 94 | 11-18 | 100/100 |
| Garton *et al*[89], 2005 | F&T | Australia | English | Schools | Healthy | 413 | 8-10 | 53 |
| Jolliffe and Farrington[6], 2006 | BES | United Kingdom | English | Schools | Healthy | 720 | 14.8 ± 0.48 | 50.8 |
| Dadds *et al*[100],2007 | GEM | Australia | English | Schools | Healthy | 2612 | 4-16 | 52.8 |
| Funk *et al*[82],2008 | CEAQ | United States | English | Schools | Healthy | 213 | 10-13 | 49.6 |
| Sallquist *et al*[62],2009 | DPES | United States | English | Maternity hospital | Healthy | 168 | 4.49 ± 0.07 | 52.9 |
| Auyeung *et al*[64],2009 | EQ-C | United Kingdom | English | Schools (centers) | Healthy + ASD | 1256 + 265 | 4-11 | 46.3/82.6 |
| Rieffe *et al*[83],2010 | EQ | Netherlands | Dutch | Schools and centers | Healthy | 109 | 1-5 | 47.7 |
| Whitt and Howard[101], 2013 | ES-PPI | United States | English | Rehab services | Antisocial | 707 | 15.5 ± 1.2 | 87 |
| Lopèz-Pèrez and Fernadèz[102], 2014 | TECA | Spain | Spanish | NA | Healthy | 670 | 10-16 | NA |
| Vossen *et al*[88],2015 | AMES | Netherlands | Dutch | Households | Healthy | 450 | 10-15 | 50 |
| Wang and Wang[87], 2015 | EToMS | China | Chinese | Schools | Healthy | 189 | 3-6 | 50.8 |
| Raine and Chen[29], 2017 | CASES | United States | English | Community | Healthy | 428 | 11-12 | NA |
| Richaud *et al*[35],2017 | EQ | Argentina | Spanish | Schools | Healthy | 479 | 9-12 | 46.3 |

Age is reported in years, as either mean ± SD or age range according to original available data; gender is reported as percentage of males. AMES: Adolescent Measure of Empathy and Sympathy; ASD: Autism spectrum disorder; BES: Basic Empathy Scale; BEI: Bryant’s Empathy Index; CASES: Cognitive, Affective and Somatic Empathy Scales; CD: Conduct disorder; CEAQ: Children’s Empathic Attitudes Questionnaire; DPES: Dispositional Positive Empathy Scale; EQ-C: Empathy Quotient for Children; EQ: Empathy Questionnaire; ES-PPI: Empathy Scale-Psychopathic Personality Inventory; EtoMS: Empathy and Theory of Mind Scale; F&T: Feeling and Thinking Scale; GEM: Griffith Empathy Measure; IRI: Interpersonal Reactivity Index; SME: Scale to Measure Empathy; TECA: Cognitive and Affective Empathy Scale (Test de Empatia Cognitiva y Afectiva); NA: not available.

**Table 2 Included studies aimed at validating adaptations (*n* = 6, A) or translations of the included measures (*n* = 19, B), and assessing further psychometric properties (*n* = 6, C)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref.** | **Measure** | **Language** | **Sample size** |
| **(A) Adaptation studies** |  |  |  |
| Auyeung *et al*[95], 2012 | EQ– adolescent version | English | 1243 |
| Bensalah *et al*[60], 2016 | BES – child version | French | 410 |
| Merino-Soto and Grimaldo-Muchotrigo[103], 2015 | BES – short version | Spanish | 135 |
| Overgaauw *et al*[59],2017 | EQ – CA version | Dutch | 1250 |
| Pechorro *et al*[104], 2018 | BES – short version | Portuguese | 543 |
| Salas-Wright *et al*[105], 2013 | BES – short version | Spanish | 208 |
| Sánchez-Pérez *et al*[58], 2014 | BES – parent report | Spanish | 364 |
| **(B) Translation studies** | | | |
| Albiero *et al*[106], 2009 | BES | Italian | 665 |
| Albiero *et al*[107], 2010 | BES | Italian | 1191 |
| Čavojová *et al*[108], 2012 | BES | Slovak | 429 |
| D'Ambrosio *et al*[109], 2009 | BES | French | 446 |
| de Wied *et al*[110], 2007 | BEI | Dutch | 1978 |
| del Barrio *et al*[111], 2004 | BEI | Spanish | 832 |
| Geng *et al*[112], 2012 | BES | Chinese | 1524 |
| Soroa *et al*[113], 201 | TECA | Basque | 504 |
| Grazzani *et al*[114], 2017 | EQ | Italian | 304 |
| Hawk *et al*[115], 2013 | IRI | Dutch | 501 |
| Herrera-López *et al*[116], 201 | BES | Spanish | 747 |
| Liu *et al*[117], 2018 | CASES | Chinese | 860 |
| Lucas-Molina *et al*[118], 2018 | EQ | Spanish | 103 |
| Pechorro *et al*[119], 2015 | BES | Portuguese | 221 |
| Mestre-Escriva *et al*[120], 2004 | IRI | Spanish | 1285 |
| Rudra *et al*[121], 2016 | EQ-C | Bengali | 51 |
| Vilte *et al*[122], 2016 | CEAQ | Spanish | 297 |
| You *et al*[123], 2018 | BES | Korean | 1524 |
| Zengin *et al*[124], 2018 | AMES | Turkish | 212 |
| **(C) Psychometric Properties** | | | |
| Anastácio *et al*[125], 2016 | BES | Portuguese | 1029 |
| Carrasco Ortiz *et al*[126], 2011 | IRI | Spanish | 721 |
| Holgado Tello *et al*[127], 2013 | IRI | Spanish | 721 |
| Lasa Aristu *et al*[128], 2008 | BEI | Spanish | 2714 |
| Lucas-Molina *et al*[129], 2016 | BEI | Spanish | 2050 |
| Pechorro *et al*[72], 201 | BES | Portuguese | 377 |

AMES: Adolescent Measure of Empathy and Sympathy; BES: Basic Empathy Scale; BEI: Bryant’s Empathy Index; CA: children and adolescents; CASES: Cognitive, Affective and Somatic Empathy Scales; CEAQ: Children’s Empathic Attitudes Questionnaire; EQ: Empathy Questionnaire; EQ-C: Empathy Quotient for Children; IRI: Interpersonal Reactivity Index; TECA: Cognitive and Affective Empathy Scale (Test de Empatia Cognitiva y Afectiva).

**Table 3 First validation of selected questionnaires (*n* = 16)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Validation** | **Subscales** | ***n*** | **Response** | **Age** | **R** | **IC** | **Reliability** | **Criterion** | **Convergent/divergent** |
| BEI | Bryant[98], 1984 | None | 22 | 1 (low) to 5 (high) | C, A | SR | α = 0.54 to 0.79 | T-R: r = 0.74 to .83 | NA | NA |
| IRI | Litvack-Miller et al[99], 1997 | Fantasy; | 28 | 0 (not well) to 4 (very well) | C | SR | NA | NA | NA | NA |
| Perspective-taking; |
| Empathic concern; |
| Personal distress |
| SME | Rey[63], 2003 | None | 15 | 1 (never) to 4 (always) | A | SR | α = 0.78 | NA | HC > CD: | NA |
| *P* = 0.008 |
| F&T | Garton et al[89], 2005 | Affective; | 12 | 1 (not like me) to 5 (very like me) | C | SR | α = 0.54 to 0.69 | NA | F > M | NA |
| Cognitive |
| BES | Jolliffe and Farrington[6], 2006 | Affective; | 20 | 1 (agree) to 5 (disagree) | A | SR | α = 0.79 to 0.85 | NA | F > M: | IRI: r = 0.43 to 0.53; |
| Cognitive | *P* < 0.0001 | TAS: r = –0.20 to –0.17; |
|  |  | SDS: r = –0.11 to 0.00 |
| GEM | Dadds et al[100], 2007 | Cognitive; | 23 | –4 (disagree) to +4 (agree) | C, A | PR | α = 0.81 (tot); | IRR: r = 0.40 to 0.38; | F > M: | IQ: r = 0.30 (cogn); |
| Affective | α = 0.62 to 0.83 | T-R: r = 0.69 | *P* < 0.001 | CAI-C: r = –0.12 to –0.31; |
|  |  |  |  | CAI-N: r = 0.05 to 0.25; |
|  |  |  |  | IRT: r = 0.30 to 0.56 |
| CEAQ | Funk et al[82], 2008 | None | 16 | No/Maybe/Yes | C | SR | α = 0.77 | RPR = 0.75; RPSI = 1.75 | F > M: | BEI: r = 0.57; |
| *P* < 0.01 | SDQ-PS: r = 0.39; |
|  | SDQ-CP: r = –0.17; |
|  | CSDTC: r = 0.39 |
| DPES | Sallquist et al[62], 2009 | None | 7 | 1 (really untrue) to 4 (really true) | P | PR | α = 0.81 | NA | NA | ITSEA-E: r = 0.43; |
| ITSEA-SC: r = 0.35; |
| Task = 0.47 |
| EQ-C | Auyeung et al[64], 2009 | None | 27 | 1 (disagree) to 4 (agree) | P, C, A | PR | α = 0.93 | T-R: r = 0.86 | HC-F > HC-M > ASD; | SQ-C: r = –0.13 |
| *P* < 0.001 |
| EQ | Rieffe et al[83], 2010 | Emotion contagion; | 20 | 1 (never) to 3 (often) | I, P | PR | α = 0.58 to 0.80 | NA | NA | NA |
| Attention to others; |
| Prosocial actions |
| ES-PPI | Whitt and Howard[101], 2013 | None | 5 | 1 (false) to 4 (true) | A | SR | α = 0.69 | NA | NA | BSI-PS: r = 0.11 to 0.30; APSD: r = –0.18 to –0.08; MAYSI-2: r = 0.08 to 0.21 |
| TECA | Lopèz-Pèrez and Fernadèz[102], 2014 | Perspective taking; | 30 | 1 (disagree) to 4 (agree) | C, A | SR |  | NA | NA | NA |
| Emotion understanding; |
| Personal distress; |
| Empathic joy |
| AMES | Vossen et al[88], 2015 | Affective; | 12 | 1 (never) to 5 (always) | C, A | SR | α = 0.75 to 0.86 | T-R: r = 0.56 to 0.69 | F > M; | IRI-EC: r = 0.29 to 0.63; |
| Cognitive; | *P* < 0.01 | IRI-PT: r = 0.21 to 0.45; |
| Sympathy |  | PBS: r = 0.14 to 0.50; |
|  |  | PA: r = –0.07 to -0.36 |
| EToMS | Wang and Wang[87], 2015 | Empathy; | 16 | 1 (never) to 5 (always) | P | PR | α = 0.71 to 0.83 | NA | F > M | WL-NiceToM: r = 0.21; |
| Nice ToM; | SL-NastyToM: r = 0.33; |
| Nasty ToM | FB: r = 0.27 (E) –0.28 (NiceToM) |
| CASES | Raine and Chen[29], 2017 | Affective; | 30 | 0 (rarely) to 2 (often) | C | SR | α = 0.63 to 0.91 | NA | F > M | IQ: r > 0; |
| Cognitive; | RPAQ-R: r = –0.11; |
| Somatic | CBCL-Ext: r < 0; |
|  | APSD: r = –0.12 to –0.39 |
| EQ | Richaud et al[35], 2017 | Emotion contagion; | 15 | 1 (never) to 4 (always) | C | SR | ω = 0.70 to 0.76 | NA | NA | PBS-C: r = 0.23 to 0.79; |
| Self-other awareness; | PBS-L: r = 0.21 to 0.49; |
| Perspective taking; | IRI-PT: r = 0.32 to 0.37; |
| Emotional regulation; | PVAS: r = –0.18 to –0.31; |
| Empathic action | EIS: r = –0.24 |

Validation refers to the original article in which the questionnaire was first validated. Construct refers to the original article in which the definition of the empathy construct for each questionnaire was provided; *n* refers to number of items. Response refers to the number of available Likert-scale responses for each item of the questionnaires. Age refers to the age range in which the original validation of the questionnaire was performed (*i.e.* infants, aged 1–3 years; preschool children aged 3–6 years; children aged 6–13 years; adolescents aged 13–18 years). R refers to type of report, either self- or parent-report. IC refers to internal consistency, measured by either Cronbach’s alpha or McDonald’s omega. Criterion and convergent/divergent refer to criterion and convergent/divergent validity, respectively. α: Cronbach’s alpha; A: adolescents; AMES: Adolescent Measure of Empathy and Sympathy; APSD: Antisocial Personality Screening Device; ASD: autism spectrum disorder; BES: Basic Empathy Scale; BEI: Bryant’s Empathy Index; BSI: Brief Symptom Inventory; C: children; CAI: Cruelty to Animals Inventory; CASES: Cognitive, Affective and Somatic Empathy Scales; CBCL: Child Behaviour Checklist; CD: conduct disorder; CEAQ: Children’s Empathic Attitudes Questionnaire; CSDTC: Crandall Social Desirability Test for Children; DPES: Dispositional Positive Empathy Scale; EIS: Emotional Instability Scale; EmQue: Empathy Questionnaire; EQ: Empathy Questionnaire; EQ-C: Empathy Quotient for Children; ES-PPI: Empathy Scale-Psychopathic Personality Inventory; EToMS: Empathy and Theory of Mind Scale; F: females; FB: false belief; F&T: Feeling and Thinking Scale; GEM: Griffith Empathy Measure; HC: healthy controls; I: infants; IC: internal consistency; IQ: intelligence quotient; IRI: Interpersonal Reactivity Index; IRR: inter-rater reliability; IRT: Interpersonal Response Task; ITSEA: Infant-Toddler Social and Emotional Assessment; M: males; MAYSI: Massachusetts Youth Screening Instrument; NA: not available; P: preschool children; PA: physical aggression; PBS: Prosocial Behaviour Scale; PR: parent-report; PVAS: Physical and Verbal Aggression Scale; R: report; RPAQ: Reactive–Proactive Aggression Questionnaire; RPR: Rasch Person Reliability; RPSI: Rasch Person Separation Index; SDQ: Strengths and Difficulties Questionnaire; SDS: Social Desirability Scale; SL: strategic lie; SME: Scale to Measure Empathy; SQ-C: Systemising Quotient for Children; SR: self-report; TAS: Toronto Alexithymia Scale; TECA: Cognitive and Affective Empathy Scale (Test de Empatia Cognitiva y Afectiva); ToM: Theory of mind; T-R: Test-retest; WL: White lie; ω: McDonald’s omega.



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