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SYSTEMATIC REVIEWS

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

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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

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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.

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INTRODUCTION

In the 19th century, the term *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,

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.

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

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).

Positive Empathy Scale (DPES) and the Empathy Scale derived from the Psychopathic Personality Inventory (ES-PPI) presenting a relatively low number of items,

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; Perspective-taking; Empathic concern; Personal distress	28	0 (not well) to 4 (very well)	C	SR	NA	NA	NA	NA
SME	Rey[63], 2003	None	15	1 (never) to 4 (always)	A	SR	α = 0.78	NA	HC > CD: *P* = 0.008	NA
F&T	Garton *et al* [89], 2005	Affective; Cognitive	12	1 (not like me) to 5 (very like me)	C	SR	α = 0.54 to 0.69	NA	F > M	NA
BES	Jolliffe and Farrington[6], 2006	Affective; Cognitive	20	1 (agree) to 5 (disagree)	A	SR	α = 0.79 to 0.85	NA	F > M: *P* < 0.0001	IRI: r = 0.43 to 0.53; TAS: r = –0.20 to –0.17; SDS: r = –0.11 to 0.00
GEM	Dadds *et al* [100], 2007	Cognitive; Affective	23	–4 (disagree) to +4 (agree)	C, A	PR	α = 0.81 (tot); α = 0.62 to 0.83	IRR: r = 0.40 to 0.38; T-R: r = 0.69	F > M: *P* < 0.001	IQ: r = 0.30 (cogn); 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: *P* < 0.01	BEI: r = 0.57; 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; *P* < 0.001	SQ-C: r = –0.13
EQ	Rieffe *et al* [83], 2010	Emotion contagion; Attention to others; Prosocial actions	20	1 (never) to 3 (often)	I, P	PR	α = 0.58 to 0.80	NA	NA	NA
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	Perspective	30	1 (disagree) to 4	C, A	SR		NA	NA	NA

	and Fernadèz [102], 2014	taking; Emotion understanding; Personal distress; Empathic joy		(agree)						
AMES	Vossen *et al* [88], 2015	Affective; Cognitive; Sympathy	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; $P < 0.01$	IRI-EC: r = 0.29 to 0.63; IRI-PT: r = 0.21 to 0.45; PBS: r = 0.14 to 0.50; PA: r = –0.07 to -0.36
EToMS	Wang and Wang[87], 2015	Empathy; Nice ToM; Nasty ToM	16	1 (never) to 5 (always)	P	PR	α = 0.71 to 0.83	NA	F > M	WL-NiceToM: r = 0.21; SL-NastyToM: r = 0.33; FB: r = 0.27 (E) –0.28 (NiceToM)
CASES	Raine and Chen[29], 2017	Affective; Cognitive; Somatic	30	0 (rarely) to 2 (often)	C	SR	α = 0.63 to 0.91	NA	F > M	IQ: r > 0; RPAQ-R: r = –0.11; CBCL-Ext: r < 0; APSD: r = –0.12 to –0.39
EQ	Richaud *et al* [35], 2017	Emotion contagion; Self-other awareness; Perspective taking; Emotional regulation; Empathic action	15	1 (never) to 4 (always)	C	SR	ω = 0.70 to 0.76	NA	NA	PBS-C: r = 0.23 to 0.79; PBS-L: r = 0.21 to 0.49; IRI-PT: r = 0.32 to 0.37; PVAS: r = –0.18 to –0.31; 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.

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)

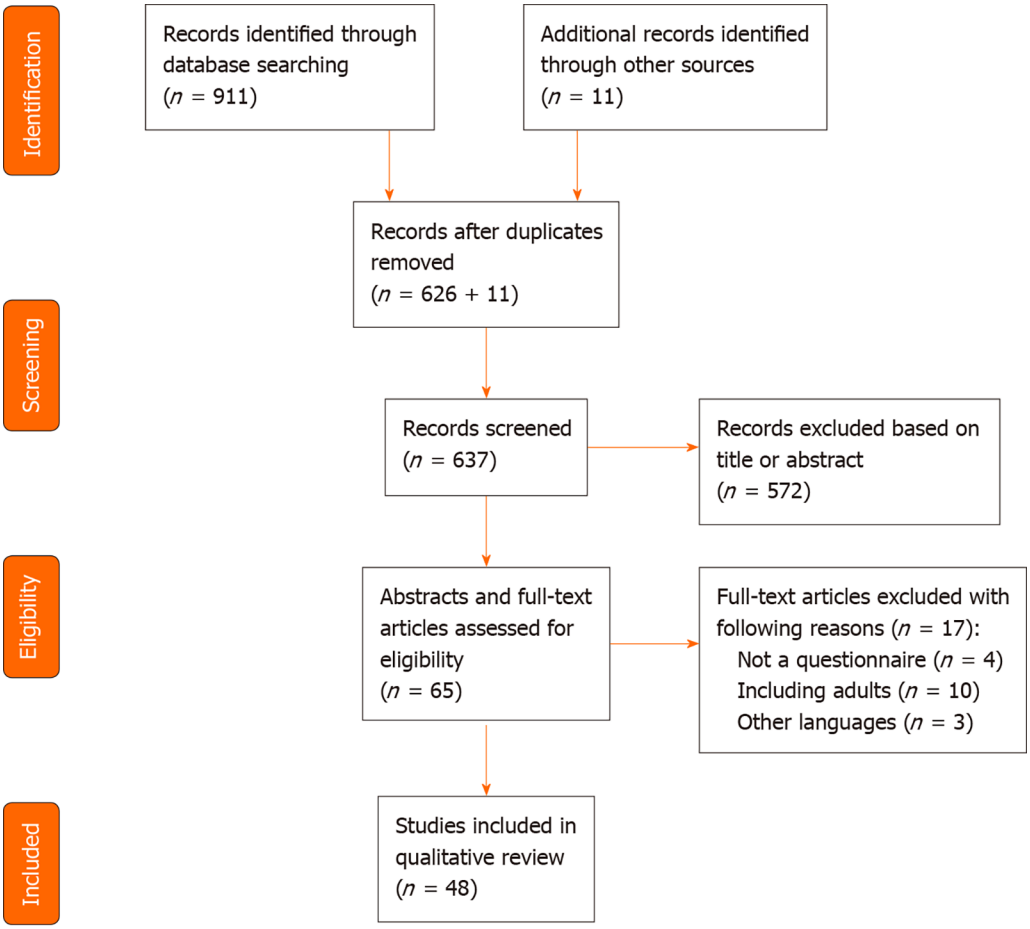


Figure 1 PRISMA flowchart. The process of identification and selection of papers according to PRISMA guidelines is shown in the flowchart. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

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 affective sensitivity, 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.

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