The handle http://hdl.handle.net/1887/32031 holds various files of this Leiden University dissertation

**Author:** Overgaauw, Sandy  
**Title:** Social reorientation in adolescence: neurobiological changes and individual differences in empathic concern  
**Issue Date:** 2015-02-19
Chapter 4:
Assessing empathy across childhood and adolescence: Validation of the Empathy Questionnaire for Children and Adolescents (EmQue-CA)

Sandy Overgaauw, Carolien Rieffe, Eveline A. Crone, Berna Güroğlu.
ABSTRACT

Empathy plays an important role in socio-emotional functioning. In this study, 1262 children and adolescents (10–15 year olds) performed the newly developed Empathy Questionnaire for Children and Adolescents (EmQue–CA) that was tested on reliability, construct validity, and concurrent validity. The EmQue–CA aimed to assess three components of empathy: Affective Empathy, Cognitive Empathy, and Prosocial Motivation. A Principal Components Analysis confirmed the three-factor model representing these three components. Reliability analyses demonstrated high construct consistency of the scales. The scales showed high construct validity, as the three concepts of the EmQue–CA were positively correlated with Empathic Concern (Affective Empathy) and Perspective Taking (Cognitive Empathy), scales of the well-validated Interpersonal Reactivity Index (Davis, 1980). With regard to concurrent validity, higher empathy was related to more awareness of others’ emotions, higher friendship quality, less focus on own affective state and lower levels of bullying behavior. The EmQue–CA is a reliable and valid empathy instrument useable for both typically and atypically developing (e.g. Severe Language Impairment, Autism Spectrum Disorder, disruptive behavior disorder) children and adolescents aged ten and over.
4.1 Introduction

Empathy is defined as the ability to read, share, and understand emotional states of others (Mehrabian & Epstein, 1972). It entails two separate but intertwined components: affective and cognitive empathy (Chakrabarti & Baron-Cohen, 2006). Affective empathy refers to sharing an emotional state of others; cognitive empathy is the ability to understand emotional states of others, also referred to as ‘perspective-taking’ (Decety & Jackson, 2004; Preston & De Waal, 2002). Feeling compassion for a suffering person is the result of this combined ability to share and understand emotions. These skills are crucial to think of ways to help the suffering person or to act upon these thoughts, often indicated by the term ‘prosocial behavior’ (Eisenberg, 2000; Jolliffe & Farrington, 2006; Goudena et al., 2007). In this sense, the tendency to act upon this empathic sharing and understanding in a prosocial manner forms the third crucial component of empathy, which we will label ‘Prosocial Motivation’. Examining this third component of empathy is particularly important during childhood and adolescence, as prosocial behavior has found to be crucial for adaptive social-emotional functioning.

Empathic skills have a large impact on how children and adolescents act toward individuals in their social group. Children with higher empathic skills are generally better able to regulate their emotions, show less aggression, and act more prosocially (Eisenberg, 2000; Pouw, Rieffe, Oosterveld, Huskens, & Stockmann, 2013). These skills are important for bonding with primary caregivers, friends, and other eminent people (Knafo, Zahn–Waxler, Van Hulle, Hyun Rhee, & Robinson, 2008). Cognitive empathy predicts high quality friendships, involving mutual reciprocity and stability (Soenens, Duriez, Vansteenkiste, & Goossens, 2007). However, cognitive empathy without the affective component can result in bullies, who are emotionally less affected by others’ emotions, tormenting defenseless peers (Jolliffe & Farrington, 2006). In similar vein, affective empathy without the motivation to emotionally support the suffering person could hamper rather than strengthen the relationship (Pouw et al., 2013). Therefore, it is useful to have an instrument that disentangles all three components of empathy (affective– and cognitive empathy, and prosocial motivation), as development might be disharmonic, which could result in symptoms of psychopathology. An instrument that can identify the different components of empathy on each of these skills enables
professionals working with children in a clinical setting to focus on specific deficits in empathic behavior.

4.1.1 Empathy measures
Albeit sharing feelings with others (affective empathy) has been included in existing empathy questionnaires (Davis, 1980; Hawk et al., 2013; Jolliffe & Farrington, 2006; Lietz et al., 2011; Mehrabian & Epstein, 1972), as well as the understanding of these feelings (cognitive empathy) (Baron-Cohen & Wheelwright, 2004; Davis, 1980; Hawk et al., 2013; Hogan, 1969; Jolliffe & Farrington, 2006; Lietz et al., 2011), the corresponding tendency to behave supportive to the person in distress to date has been mainly neglected (Rieffe, Ketelaar, & Wiefferink, 2010). Moreover, due to difficult grammar constructions, many of the existing questionnaires for empathy are less suitable for children with language impairments, as we often see in children with Specific Language Impairment (SLI; Durkin & Conti-Ramsden, 2007), ASD (Pouw et al., 2013), and/or hearing impairments (Ketelaar, Rieffe, Wiefferink, & Frijns, 2013). Therefore, we designed an empathy questionnaire for children and young adolescents, accessible to children from the age of ten, and also easy to understand for less well developing children and adolescents, consisting of the following three scales: 1) Affective Empathy: a scale that measures the extent to which the subject feels for the emotion of the suffering person, 2) Cognitive Empathy: a scale that measures the extent to which the subject also understands why the person is in distress, and 3) Prosocial Motivation: a scale that measures the extent to which the subject is also inclined to actually help or support the suffering person.

4.1.2 Present study
The current study aimed to examine the construct and concurrent validity of the Empathy Questionnaire for Children and Adolescents (EmQue-CA) based on a dataset of participants aged 10–15. For the construct validity, we examined links of the EmQue-CA scales with two scales of the Interpersonal Reactivity Index (IRI), which is a commonly used measure for empathy across adolescence (Davis, 1980; Hawk et al., 2013). We expected positive correlations between the scales Empathic Concern (Affective Empathy) and Perspective Taking (Cognitive Empathy) of the IRI with the Affective and Cognitive Empathy scales of the EmQue-CA respectively.
To examine concurrent validity, the associations of the EmQue-CA scales with related concepts have been examined. Concerning intrapersonal functioning, it was expected that adolescents high on Affective Empathy would be less focused on their own internal affective states (i.e. lower scores on the scales Differentiating Emotions and Bodily Awareness of Emotions of the EAQ, the Emotion Awareness Questionnaire), but give more importance to be informed about others’ affective states (i.e. higher scores on scale Attending to Others’ Emotions, EAQ) (Rieffe & De Rooij, 2012). Furthermore, it was expected that adolescents scoring high on Cognitive Empathy and Prosocial Motivation would be more focused on others’ emotions (i.e. higher scores on the scale Attending to others’ Emotions), and show a negative or no relationship with Differentiating Emotions and Bodily Awareness of Emotions.

Concerning interpersonal functioning, it was expected that adolescents high on Affective Empathy would bully less (De Wied, Goudena, & Matthys, 2005; Menesini, Camodeca, & Nocentini, 2010; Rieffe, Camodeca, Pouw, Lange, & Stockmann, 2013; Stavrinides, Georgiou, & Theofanous, 2010; Warden & Mackinnon, 2003) and have better friendship qualities as these adolescents feel for another peer in distress. Moreover, reporting higher friendship qualities was also expected to be related to Cognitive Empathy, as understanding why someone feels distressed is important for maintaining good social relationships. For Cognitive Empathy in relation to Bullying there was no clear expectation. In fact, there is a controversy in the literature suggesting on the one hand that bullies are high on Cognitive Empathy, which makes them the so-called cold-blooded intelligent bullies (Rieffe et al., 2013; Sutton, Smith, & Swettenham, 1999). And on the other hand, the literature suggests that adolescents high on Cognitive Empathy would bully less because of a better understanding of the causes for the distress and thus better know how to support this person (Kokkinos & Kipritsi, 2011). Additionally, we expected that adolescents who are more inclined to help the person in distress (high scores on Prosocial Motivation), bully less, and have better friendship qualities.

Our final aim of this study was to examine empathy development across childhood and adolescence by studying age differences for the three empathy components assessed by the EmQue-CA (Van der Graaff et al., 2014). We hypothesized that empathic abilities in general would show age related increases, though with prudence as the literature shows inconsistencies (Eisenberg, Cumberland, Guthrie, Murphy, & Shepard, 2005; Lockwood, Seara-
Cardoso, & Viding, 2014; Mestre, Samper, Frías, & Tur, 2009; Davis & Franzoi, 1991). Additionally, we took the role of gender into account. We expected affective empathy to remain stable with age in girls and to show a decrease with age in boys. Concerning cognitive empathy we hypothesized that both boys and girls would show a developmental increase (Taylor, Barker, Heavey, & McHale, 2013; Van der Graaff et al., 2014). For prosocial motivation our expectation was to find an increase in prosocial motivation with age, stronger in girls.

4.2 METHOD

4.2.1 Participants

In total 1262 children and adolescents aged between 10 and 15 years participated in the study (Mean age = 13.24; SD = 1.68; 50% girls). All participants were recruited from local elementary and high schools with different levels of education, including preparatory schools for vocational secondary education and university. From the 974 participants (77% of the sample), a total of 124 (13%) children attended elementary school, 222 (23%) attended secondary vocational education, 175 (18%) attended higher general secondary education, and 453 (46%) attended secondary science education.

| TABLE 1 | Sample sizes, gender distribution (%), mean age and standard deviation (SD) in years of the participants from six age groups. |
|---------|---|---|---|---|---|---|
|         | 10 years | 11 years | 12 years | 13 years | 14 years | 15 years |
| Number of participants | 159 | 134 | 194 | 280 | 279 | 216 |
| Female (%) | 79 (50) | 73 (54) | 86 (44) | 144 (51) | 143 (51) | 106 (49) |
| Mean age | 10.3 | 11.25 | 12.59 | 13.44 | 14.39 | 15.47 |
| SD age | .32 | .30 | .27 | .29 | .28 | .27 |

Note. The Chi square analyses indicated that gender distribution did not differ across the age groups ($\chi^2 (5) = 5.16, p = .40$; see Table 1).

4.2.2 Procedures

Both schools and parents provided written consent for participation. Data collection took place at school. The participants were given classical instructions where it was emphasized that participation was entirely anonymous and voluntary and that there were no right or wrong answers. They could ask questions any time during the data collection session, which was part of a larger session and
lasted 45 minutes on average. The university ethical committee approved the procedures and questionnaires.

4.2.3 Measures

**Empathy Questionnaire for Children and Adolescents (EmQue-CA).** This self-report measure consists of 19 items grouped in three scales: Affective Empathy (7 items), Cognitive Empathy (6 items), and Prosocial Motivation (6 items; see Figure 1 for a complete list of all items). Participants were asked to rate to what extent the description was true for them on a 3-point scale: 1) not true, 2) somewhat true, and 3) true (Pouw et al., 2013). All questions were formulated positive, where higher scores reflected higher empathic abilities. Mean scores were calculated per scale.

**Interpersonal Reactivity Index (IRI).** Two scales of the IRI (Davis, 1980) were obtained from subsamples of this study: Empathic Concern (e.g., ‘I am often quite touched by things that I see happen’; N = 171), and Perspective Taking (e.g., ‘I believe that there are two sides to every question and I try to look at them both’; N = 1145). From this point forward, the Empathic Concern scale will be referred to as Affective Empathy, and the Perspective Taking scale will be indicated with Cognitive Empathy. Both scales contained 6 items; each item was rated on a 5-point Likert scale with 0) completely untrue, 1) not quite true, 2) in between, 3) quite true and 4) completely true. The construct consistency between the items of the scales was good (see Table 2).

**Emotion Awareness Questionnaire (EAQ).** Three scales of the well validated EAQ were included in a subsample of this study (Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008; N = 171): Differentiating Emotions (7 items; e.g. ‘Sometimes, I feel upset and I have no idea why’), Bodily Awareness of Emotions (5 items; e.g. ‘When I am scared or nervous, I feel something in my tummy’) and Attending to Others’ Emotions (5 items; e.g. ‘If a friend is upset, I try to understand why’). All items were answered on a 3-point scale with 1) not true, 2) sometimes true, 3) often true. Mean scores were calculated per scale. The items of the scales showed good construct consistency (see Table 2).

**Friendship Quality Scale (FQS).** We used an adapted version of the FQS (Bukowski, Hoza, & Boivin, 1994; N = 863) containing 28 items assessing five aspects of friendship quality: companionship, help, security, closeness, and conflict. Participants were asked to indicate how much each item was true for their relationship with their best friend on a 5-point Likert scale ranging from (1)
not true to (5) completely true. Based on a previously reported subdivision of the questionnaire in two separate factors (Demir & Urberg, 2004), exploratory factor analyses were performed to make a distinction between positive and negative friendship quality. Here we included the positive friendship quality factor with a total of 13 items (e.g., ‘My friend and I help each other’). Sum scores were calculated and higher scores indicated higher relationship quality. Cronbach’s Alpha of .90 showed high construct consistency of the positive Friendship Quality Scale (see Table 2).

**Olweus Bully/Victim Questionnaire (OB/VQ).** Self-reported bullying was assessed using the well-validated OB/VQ (Olweus, 1986; N = 967). Participants were asked to indicate how often they engaged in different acts of bullying in the last six months on a 5-point scale with answers varying from (1) I haven’t bullied other children to (5) several times a week. Sum scores of the six bullying items were used to indicate engagement in bullying. The consistency of the bullying subscale is high with a Cronbach’s Alpha of .80 (see Table 2).

### 4.2.4 Statistical analyses

In order to assess the construct validity of the EmQue–CA, we first examined the intended three-factor structure and conducted a Principal Component Analyses (PCA) with varimax rotation. The three factors were based on the previously established scales and required that each intended item would show a factor loading of at least > .40 on their key factor. Furthermore, the inter-factor correlations were computed to demonstrate diversity between the scales, and Cronbach’s alphas were computed to examine construct consistencies. Next, we examined the associations between the Affective and Cognitive Empathy scales of the EmQue–CA with the scales Affective Empathy and Cognitive Empathy of the IRI respectively. The concurrent validity of the EmQue–CA was also tested, for which we examined the associations between the three EmQue–CA scales with emotion awareness, friendship quality, and bullying behavior. Finally, we applied Fisher r-to-Z transformation to calculate a value of Z to assess the possible significance of the difference between boys and girls for the correlations between the scales of the EmQue–CA and the scales of the IRI, EAQ, FQS and OB/VQ, and age.
4.3 Results

4.3.1 Factor structure, internal consistency and construct validity
A Principal Component Analysis (PCA) on all 19 items was performed with three factors (see Figure 1). All items loaded on the intended factor, except for one item that failed to load on the intended factor for Cognitive Empathy and was thus removed (‘I often don’t understand why someone gets angry’). Cronbach’s alphas of the three scales of the EmQue-CA indicated good internal consistencies for the scales: Affective Empathy .68, Cognitive Empathy .64, and Prosocial Motivation .75 (see Table 2). The mean scores in Table 2 show that girls score higher on Prosocial Motivation, but not on the other scales. Correlations between all three scales were significant (see Table 3), also when analyzed per age group, but still below .60, so there was no collinearity. Additionally, correlations for the Affective and Cognitive empathy scales of the EmQue-CA correlated positively with the IRI scales \( r(164) = .36; p < .01 \) and \( r(1138) = .34; p < .01 \), respectively.

4.3.2 Concurrent validity
To study the concurrent validity of the EmQue-CA, we examined the relationship between the EmQue-CA scales and related constructs (see Table 3). As expected, the results showed negative correlations between Affective Empathy with Differentiating Emotions \( r(117) = -.28; p < .01 \) and Bodily Awareness of Emotions \( r(117) = -.28; p < .01 \). Cognitive Empathy and Prosocial Motivation were related positively to higher scores on the EAQ scale Attending to Others’ Emotions \( r(117) = .43; p < .01 \); and \( r(117) = .22; p < .05 \) respectively.

When we examined the relationships of the EmQue-CA scales with indices for social functioning, we found that Friendship quality correlated positively with Affective Empathy \( r(862) = .36, p < .01 \), Cognitive Empathy \( r(863) = .30, p < .01 \), and Prosocial Motivation \( r(863) = .42, p < .01 \). Bullying, on the other hand, correlated negatively with all three scales of the EmQue-CA (Affective Empathy: \( r(966) = -.14, p < .01 \); Cognitive Empathy: \( r(967) = -.20, p < .01 \); Prosocial Motivation: \( r(863) = -.42, p < .01 \)). Moreover, all correlations reported in this section remained significant after controlling for age. Additionally, the means for the related constructs have been calculated separately for boys and girls (see Table 2). Results revealed gender differences only for Bullying, boys bullying more often than girls. The other constructs did not show gender differences.
To assess the significance of the difference between boys and girls on relationships between scales of the EmQue-CA and other variables in this study, we applied Fisher r-to-Z transformation (see Table 3). Fisher transformations showed that the correlation between Affective Empathy and Differentiating Emotions differed significantly between boys and girls, resulting in only a significant negative relationship for boys ($Z = -2.3; p < .05$). The correlation between Prosocial Motivation and Attending to Others’ Emotions also showed gender differences ($Z = 2.78; p < .01$), resulting in a significant negative correlation for boys but not for girls. Additionally, Cognitive Empathy measured by the EmQue-CA and Cognitive Empathy measured by the IRI showed a difference between boys and girls, girls showing a significant stronger positive correlation than boys ($Z = -2.63; p < .01$).

### TABLE 2 | Construct consistencies of the three scales of the Empathy Questionnaire for children and adolescents (EmQue-CA).

|                  | Number of items | N     | Cronbach’s Alpha | Inter-item correlation | Mean (SD) boys | Mean (SD) girls |
|------------------|-----------------|-------|------------------|------------------------|----------------|----------------|
| **EmQue-CA**     |                 |       |                  |                        |                |                |
| Affective Empathy| 7               | 1253  | .68              | .23                    | 1.85 (.34)     | 2.18 (.35)     |
| Cognitive Empathy| 5               | 1255  | .64              | .26                    | 2.36 (.38)     | 2.51 (.36)     |
| Prosocial Motivation | 6        | 1258  | .75              | .33                    | 2.42 (.42)*    | 2.66 (.34)*    |
| **IRI**          |                 |       |                  |                        |                |                |
| Affective Empathy| 6               | 171   | .73              | .31                    | 2.25 (1.02)    | 2.50 (94)      |
| Cognitive Empathy| 6               | 1145  | .69              | .27                    | 2.45 (.66)     | 2.63 (.66)     |
| **EAQ**          |                 |       |                  |                        |                |                |
| Differentiating Emotions | 7        | 117   | .75              | .30                    | 2.39 (.45)     | 2.34 (.41)     |
| Bodily Awareness of emotions | 5        | 117   | .79              | .43                    | 1.93 (.44)     | 1.68 (.42)     |
| Attending to others’ emotions | 5        | 117   | .61              | .24                    | 2.37 (.40)     | 2.62 (.33)     |
| Friendship Quality|                |       |                  |                        |                |                |
| Bullying         | 17              | 863   | .90              | .37                    | 60.05 (10.73)  | 68.79 (9.98)   |
|                  | 6               | 908   | .80              | .42                    | .94 (.59)*     | .67 (.49)*     |

Note. Using independent t-tests, the means indicated with a * denote significant group differences ($p < .05$).
Validation of the Empathy Questionnaire

4.3.3 Relation of EmQue-CA scales with age

Results showed a positive correlation between Age and Affective Empathy: $r(1253) = .10$, $p < .01$, a negative correlation between Age and Prosocial Motivation: $r(1258) = -.14$, $p < .01$, and no correlation between age and Cognitive Empathy. However, when testing for group differences for the correlations of the EmQue-CA scales and age between boys and girls by applying Fisher r-to-Z transformation to calculate a value of $z$, results showed a significant difference for Affective Empathy and Age ($z = -2.30$; $p < .05$). Girls showed a positive relationship between age and Affective Empathy ($r(627) = .20$, $p < .01$), whereas there was no significant relationship for boys (see Table 3).
TABLE 3 | Correlations between the scales of the EmQue-CA and the scales of the IRI, EAQ, friendship quality, and bullying.

|                      | Affective Empathy (boys/girls) | Cognitive Empathy (boys/girls) | Prosocial Motivation (boys/girls) |
|----------------------|---------------------------------|---------------------------------|----------------------------------|
| EmQue-CA             |                                 |                                 |                                  |
| Affective Empathy    | 1                               | .37**                           | .46**                            |
| Cognitive Empathy    | .37**                           | 1                               | .42**                            |
| Prosocial Motivation | .46**                           | .42**                           | 1                                |
| Age                  | .02/.20**                        | .04                             | -.14**                           |
| IRI                  |                                 |                                 |                                  |
| Affective Empathy    | .33**                           | .19*                            | .21**                            |
| Cognitive Empathy    | .35**                           | .25**/.39**                     | .40**                            |
| EAQ                  |                                 |                                 |                                  |
| Differentiating Emotions | -.46**/- .06                 | -.08                            | -.06                             |
| Bodily Awareness of Emotions | -.26**                   | -.02                            | -.18                             |
| Attending to Others’ Emotions | .25**                    | .42**                           | .37**/- .14                      |
| Friendship quality   | .36**                           | .30**                           | .42**                            |
| Bullying             | -.15**                          | -.20**                          | -.27**                           |

Note. * p < .05, ** p < .01. Correlations are only presented separately for boys/girls when they significantly differed when tested by the Fisher r-to-Z transformation. All correlations remained significant when corrected for age.

4.4 Discussion

In this study we examined the construct and concurrent validity of the EmQue-CA, a newly developed questionnaire for Children and Adolescents, that aims to assess the three major components that empathy consists of: Affective Empathy (feeling for the other person in distress), Cognitive Empathy (understanding where the distress comes from), and the urge that one can feel to help the other person in distress, which was labeled as Prosocial Motivation. The outcomes of this study confirm the three-factor structure. Moreover, the three identified scales (Affective Empathy, Cognitive Empathy, and Prosocial Motivation) show good internal consistencies, as well as correlations with related constructs in the expected directions. Both indices for social functioning (friendship quality and bullying) were associated with all three EmQue-CA scales.

The negative correlations between Affective Empathy and the scales Bodily Awareness of Emotions and Differentiating Emotions were as expected. Children and adolescents who were more focused on other people’s distress
as assessed by the Affective Empathy scales, were less focused on their own internal state, as assessed by Bodily Awareness of Emotions. Prior studies have also shown that children or adolescents who were too much occupied by their own internal state, were not paying sufficient attention to the outside world and other people (Rieffe, & de Roi, 2012). In order to sense the feelings of another person, one needs to overcome the idiosyncratic focus and be able to focus on the other person’s feelings instead. A willingness to Attend to Others’ Emotions was positively correlated with all three EmQue-CA scales, but most strongly with Cognitive Empathy. This makes sense as affective aspects of empathy, that is, the tendency to feel for the other person is supposed to be innate (Decety & Meyer, 2008), and triggered by the mirror neuron system, but the cognitive aspect of empathy, that is, understanding why the other person feels distressed, requires a genuine interest in the other person, which is reflected in the EAQ scale that measures a person’s tendency to Attend to Others’ Emotions. Unlike the affective empathy skill, cognitive empathy might more strongly reflect an intention, a skill that people can apply or not, depending on their social goals. In this sense, cognitive empathy reflects a higher order reflection than affective empathy (Decety & Meyer, 2008).

The positive relationship between friendship quality and empathy is in line with our expectations and confirms the importance of empathic abilities for social interactions irrespective of gender (Allemand, Steiger, & Fend, 2014; Soenens, Duriez, Vansteenkiste, & Goossens, 2007). High levels of empathy also corresponded with low levels of bullying behavior, indicating the protective role of empathic abilities in the motivation for offending. The finding that boys reported higher bullying behavior compared to girls is in line with previous studies on physical aggression (Warden & Mackinnon, 2003). To further unravel the specific role of empathy in social interactions during childhood and adolescence, examining how these components are related to the development of both positive and negative relationships is particularly important.

Empathy is an important tool for adaptive social interactions, which emphasizes the importance of investigating these abilities more thoroughly, especially in less well developing groups that may be delayed in or missing one or more components of empathy. Different studies already denoted the possibility of higher levels of affective empathy, combined with lower levels of cognitive empathy in children and adolescents with Autism Spectrum Disorder.
(ASD), creating tension for these children who might then have no idea how to react adaptively when affectively aroused (Pouw et al., 2013). In contrast, the rule-breaking behavior of children and adolescents diagnosed with Oppositional Defiant Disorder (ODD) or Conduct disorder (CD) could be due to lower levels of affective empathy, which in turn could hinder them in forming and maintaining friendships with peers (Taylor, Barker, Heavey, & McHale, 2013). Future studies could focus on the development of empathic abilities in less well developing groups (e.g. SLI, ASD, and ODD/CD) and on the relationship with the person they empathize with. In the past, Meyer and colleagues (2013) for example showed that empathy for friends activated brain areas important for sharing emotions, whereas empathy for strangers activated a brain network that is involved in reasoning about others’ intentions. Perhaps this could explain the inconsistencies in the literature concerning the development of empathy.

Furthermore, our results showed a developmental increase in Affective Empathy in girls, a developmental decrease in Prosocial Motivation in both boys and girls, and no age related changes for Cognitive Empathy. The finding that Affective Empathy is higher in girls than in boys was in accordance with previous findings that indicate that girls are more tended to share emotions with friends and other eminent people (Taylor, Barker, Heavey, & McHale, 2013). The age related increase deviates from previous findings, though this could be explained by differences in selected age groups. It could be that Affective Empathy increases in early adolescence and stabilizes around mid-adolescence (Van der Graaff et al., 2013). The absence of age related differences in Cognitive Empathy was against expectations, as previous research demonstrated developmental increases in both boys and girls. A possible explanation could be that cognitive empathy develops from mid-adolescence onwards, as Van der Graaff and colleagues reported an age effect between 13 and 18 (Van der Graaff et al., 2013). Finally, the developmental decrease in Prosocial Motivation in both boys and girls was unexpected and cannot be readily explained by previous findings. However, it should be noted that the differences in means levels of Prosocial Motivation in the different age groups are rather small and the reported age differences should be replicated and interpreted with caution (see Table S1).

Taken together, the EmQue–CA presents a significant contribution to the knowledge on empathic abilities in children and adolescents. Particularly, the scale assessing Prosocial Motivation presents a valuable addition to existing questionnaires measuring empathy. Future studies should further focus on
the development of empathic abilities, as empathy has found to be of great importance in forming and maintaining social relationships that are crucial for learning how to follow social rules.

Supplementary material

| TABLE S1 | Mean and standard deviations of scores of the Empathy Questionnaire for children and adolescents (EmQue-CA): per scale and age group. |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
|          | N  | 10 years M (SD) | 11 years M (SD) | 12 years M (SD) | 13 years M (SD) | 14 years M (SD) | 15 years M (SD) |
| Affective Empathy | 1253 | 1.93 (.39) | 1.97 (.35) | 1.95 (.36) | 2.05 (.38) | 2.05 (.38) | 2.04 (.41) |
| Cognitive Empathy | 1255 | 2.37 (.4) | 2.43 (.37) | 2.4 (.36) | 2.43 (.37) | 2.44 (.37) | 2.43 (.38) |
| Prosocial Motivation | 1258 | 2.63 (.36) | 2.6 (.34) | 2.48 (.36) | 2.56 (.4) | 2.47 (.45) | 2.47 (.41) |