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Associations with Emotion Regulation and Psychosocial Adjustment

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The German Version of the Emotion Awareness Questionnaire for Children and Adolescents: Associations with Emotion Regulation and Psychosocial Adjustment

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ABSTRACT
Emotional awareness is an important variable for children’s and adolescents’ social and emotional development. The aim of this study was to examine the psychometric properties (e.g., factor structure, internal consistencies) of scores on the German translation of the Emotion Awareness Questionnaire (EAQ; Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008). Furthermore, to examine the concurrent validity, associations of the six subscales (Differentiating Emotions, Verbal Sharing of Emotions, Not Hiding Emotions, Bodily Unawareness, Attending to Others’ Emotions, Analyses of Emotions) with emotion regulation, internalizing and externalizing problems, and prosocial behavior were investigated. Questionnaire data of 1,018 adolescents aged between 11 and 18 were analyzed. The proposed six-factor structure was replicated and internal consistencies were satisfactory. Meaningful associations of the six EAQ subscales with emotion regulation and psychosocial adjustment were found, proving the concurrent validity of this questionnaire. In general, higher emotional awareness was associated with more functional emotion regulation and prosocial behavior, and less dysfunctional emotion regulation and internalizing and externalizing problems. Significant gender differences were detected and are discussed. Overall, the findings suggest that the German EAQ is a useful instrument to assess children’s and adolescents’ emotional awareness.

Emotion experiences, which are a fundamental part of human existence, have been addressed by research from various theoretical perspectives (Barrett, Mesquita, Ochsner, & Gross, 2007). Lambie and Marcel (2002) provided a theoretical framework addressing the variety of emotion experiences and suggested that individuals are confronted with a multifarious sensory input (phenomenological aspects; e.g., bodily sensations) when experiencing an emotion. However, the perception is incomplete, situation-dependent, and characterized by interindividual differences. This might be due to a second aspect of emotion experiences, namely emotional awareness (EA), which is created by focal attention to certain aspects of the phenomenology. EA is defined as the attentional process that enables individuals to monitor emotion experiences, to differentiate between various qualities of emotions, to locate the antecedents, and to perceive physiological aspects of the emotion experience. Moreover, this process is complemented by attitudinal aspects: Emotions of oneself and others can be valued positively or negatively, and regarded as private or interpersonal processes, which might result in different beliefs about whether emotions should be communicated and expressed (Rieffe & De Rooij, 2012; Rieffe, Oosterveld, Miers, Meerum Terwogt, & Ly, 2008).

EA is considered an important variable in children’s and adolescents’ development, as it is associated with various intrapersonal and interpersonal factors, such as appropriate emotion regulation (ER), behavioral and emotional problems, and the quality of social relationships (Mavroveli, Petrides, Rieffe, & Bakker, 2007; Suveg, Hoffman, Zeman, & Thomassin, 2009). Especially throughout adolescence, individuals experience multiple age-related changes, which are of biological (e.g., puberty, brain maturation), cognitive (e.g., metacognitive development), and social nature (e.g., changes in peer relationships; for an overview see Meschke, Peter, & Bartholomae, 2012). These changes are important for the development of EA: First, the ability to use metacognitive strategies provides early adolescents with greater awareness of their own feelings. Second, as frequency and relevance of peer interactions gradually increase, understanding and analyzing emotions of others becomes more important (Booker & Dunsmore, 2017; Halberstadt, Denham, & Dunsmore, 2001). Beyond that, the likelihood to develop psychopathological symptoms increases in adolescence (Costello, Copeland, & Angold, 2011), and EA has been found to be associated with, for example, the development of internalizing symptoms (Suveg et al., 2009). Taken together, this age group might be especially prominent for examining the role of EA.

Despite the importance of EA for successfully dealing with developmental tasks in childhood and adolescence, research has been lacking an economic self-report measure...
to assess EA in this age group. Hence, Rieffe et al. (2008) developed the Emotion Awareness Questionnaire (EAQ), which covers the diverse facets of EA with six subscales: (1) Differentiating Emotions, which also includes locating its antecedents; (2) Verbal Sharing of Emotions, referring to the communication of emotions; (3) Not Hiding Emotions, comprising the expression of emotions; (4) Bodily Unawareness, 1 including physiological aspects of emotions; (5) Attending to Others’ Emotions; and (6) Analyses of (Own) Emotions, referring to the willingness to face one’s own and others’ emotions. The EAQ has been translated and evaluated in many languages (e.g., Dutch, Spanish, French). However, this questionnaire has, so far, not been available in German. Therefore, the aim of this study was to investigate the psychometric properties (e.g., internal consistencies, factor structure) of scores on the German translation of the EAQ, as well as to examine its concurrent validity (associations with psychosocial adjustment and ER).

Theoretical considerations and empirical findings on associations of EA with various outcome variables can be found in different fields of research: First of all, EA has been examined in the context of psychosomatic complaints, especially alexithymia. This multifaceted construct refers to difficulties in identifying and describing one’s own and others’ feelings. Furthermore, an externally oriented thinking style is characteristic for alexithymic individuals (Nemiah, Freyberger, & Sifneos, 1976; Taylor, Bagby, & Parker, 1997). Second, the concept of emotional intelligence comprises—among others—the perception of emotions (e.g., emotion recognition in oneself or in others’ facial expressions and postures) and the understanding of emotions (e.g., ability to analyze emotions and understand complex emotional states; Mayer & Salovey, 1997), which are also key aspects of EA. With regard to these two research fields, it can be said that the alexithymia construct is not as comprehensive as EA, whereas the concept of emotional intelligence is overly inclusive. In addition, research on ER has included the role of EA (e.g., Barrett, Gross, Christensen, & Benvenuto, 2001; Gross, 2015). In the following, theoretical considerations and empirical findings of the different research fields are outlined.

Associations of emotional awareness with emotion regulation

EA has been suggested to be a prerequisite for ER. The first stage of ER (labeled identification) in the Extended Process Model of Emotion Regulation by Gross (2015) comprises not only setting the goal to regulate the emotion (e.g., “I want to change my emotional state”), but also the perception (e.g., “I’m angry”) and valuation of emotions (e.g., “I don’t like being angry”), which are aspects of the previously mentioned definition of EA. This illustrates that “the time course and regulation of emotions are often dependent on awareness, or lack of awareness, of emotion experience” (Lambie & Marcel, 2002, p. 220), because if individuals do not perceive their emotion, they would neither be able to evaluate it, nor would they seek to change the emotional state.

Empirically, research findings have suggested that poor EA is associated with more emotion dysregulation and less adaptive emotion management (Penza-Clyve & Zeman, 2002; Suveg et al., 2009). The ability to differentiate between various negative emotions has also been found to be positively associated with ER, especially when emotion intensity is high (Barrett et al., 2001). Furthermore, Mavroveli et al. (2007) found higher emotional intelligence to be associated with more adaptive and less maladaptive coping in an adolescent sample. These findings support the assumption that EA is important for successful ER. Beyond the relation between EA and ER, numerous studies on this topic also considered the resulting behavior (e.g., behavioral problems). Results on this relationship are presented within the following section.

Associations of emotional awareness with psychosocial adjustment

The majority of studies on the association of EA and children’s and adolescents’ psychosocial adjustment have focused on internalizing problems, and have provided consistent findings. Cross-sectional and longitudinal data have suggested that different aspects of EA are negatively associated with depression, anxiety, and somatic complaints (Kranzler et al., 2016; Mavroveli et al., 2007; Penza-Clyve & Zeman, 2002; Suveg et al., 2009; Zeman, Shipman, & Suveg, 2002). Furthermore, Rieffe and De Roij (2012; using the EAQ) found developmental trends of different aspects of EA to be associated with developmental trends of internalizing problems. In this regard, individuals’ abilities in differentiating emotions (Subscale 1 of the EAQ) was negatively associated with rumination and worry, depression, and also fear. Additionally, Not Hiding Emotions (Subscale 3) was associated with fewer symptoms of rumination and worry, and Attention to Others’ Emotions (Subscale 5) and Analyses of Emotions (Subscale 6) were related negatively to depressive symptoms. Overall, there is comprehensive and consistent evidence that poor EA is associated with more internalizing symptoms.

By contrast, research on the relation of EA with externalizing symptoms is limited, less consistent, and predominantly based on clinical data. In a sample of children with attention deficit hyperactivity disorder (ADHD), poor EA was linked to more reactive aggression, greater ER difficulties, and a higher probability for the presence of comorbid disorders (Factor, Rosen, & Reyes, 2016). Kats-Gold, Besser, and Priel (2007) found deficient emotion recognition to be associated with lower social competence and more behavioral problems in a group of boys at risk of ADHD. However, no significant relations were found in the healthy control group, which is in line with previous studies (Penza-Clyve & Zeman, 2002; Zeman et al., 2002), suggesting that

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1 Originally, this subscale was named Bodily Awareness (Rieffe et al., 2008). As higher scores indicate less bodily awareness, the scale has been renamed Bodily Unawareness (Rieffe & Camodeca, 2016).
significant associations of EA and externalizing symptoms are more likely to be found in clinical samples. Nevertheless, higher scores on emotional intelligence, which is a broader concept that includes EA, were, in fact, associated with less antisocial behavior in samples of healthy children and adolescents (Mavroveli et al., 2007; Petrides, Sangareau, Furnham, & Frederickson, 2006). Even though empirical findings are diverse, it seems reasonable that deficits in EA not only contribute to internalizing, but also to externalizing problems: This is because poor EA was found to be associated with increased information processing errors (Szczygiel, Buczyn, & Bazinska, 2012). Lemerise and Arsenio (2000) suggested that aspects of EA (e.g., recognizing one’s own and others’ emotions) are included in the first step of information processing, namely the encoding of internal and external cues. Individuals with poor EA might, for one thing, hardly deal with their emotions (e.g., because of not paying attention), which probably entails a prolonged emotional state (e.g., depressive or aggressive mood) in which the emotion is detached from the event that caused the emotion (Rieffe & De Rooij, 2012). For another thing, inappropriate ER strategies for handling emotions might be chosen (e.g., because of being unable to identify the specific type of emotion). In both cases, an unfavorable course of encoding at the very beginning of information processing might result in inappropriate or unhealthy cognitions, beliefs, and response decisions, which (in the long term) might result in psychopathological symptoms that can be externalizing or internalizing in nature (Berenbaum & Boden, 2014; Lemerise & Arsenio, 2000).

Beyond research on the associations of EA with unfavorable behavior, relations with positive aspects of psychosocial adjustment should also be examined. Prosocial behavior, which is defined as “voluntary behavior intended to benefit another” (Eisenberg, Fabes, & Spinrad, 2006, p. 646) has been the focus of previous research. Several studies found that children’s and adolescents’ emotional intelligence was positively associated with prosocial behavior and social competence (Mavroveli et al., 2007; Petrides et al., 2006). Furthermore, a higher awareness of one’s own and others’ emotions was related to more cognitive and affective empathy (Rieffe & Camodeca, 2016), which, in turn, is related to aspects of prosocial behavior (Eisenberg & Miller, 1987). There is also longitudinal evidence showing that preschool children’s emotion knowledge positively predicted their social skills in Grade 3 (Izard et al., 2001). Overall, most research findings indicate that an advanced EA results in a more favorable outcome.

This study

Previous research findings have suggested that the investigation of the role of EA for the development of ER and psychosocial adjustment might further contribute to understanding the developmental pathways of positive and problematic behavior. Hence, an economic measure to assess EA in late childhood and adolescence is needed, as this age is especially important for the development of psychopathological symptoms (Costello et al., 2011). The EAQ (Rieffe et al., 2008) has been developed for the age group of interest and is already available in 10 languages, but yet not in German. Therefore, the objective of this study was to examine the psychometric properties of scores on the German translation of the EAQ by replicating the six-factor structure; by analyzing internal consistencies, means, and standard deviations of the subscales; and by examining gender differences and associations with adolescents’ age. Furthermore, the concurrent validity was tested regarding ER (Model 1) and psychosocial adjustment (Model 2), including analyses on whether relations were moderated by adolescents’ gender. As higher scores on all EAQ subscales indicate positive qualities of EA, we expected positive associations with functional ER and prosocial behavior, but negative associations with dysfunctional ER, internalizing problems, and externalizing problems.

Method

Participants and procedure

Data stem from a project supported by the German Research Foundation (DFG). Procedures were ethically approved by the Ethics Commission of the German Psychological Society (DGPs). A total of 11 schools from a midsize town and its surrounding areas in northwest Germany agreed to participate. Information letters were distributed to approximately 2,300 adolescents attending Grades 6 to 9. Participation was on a voluntary basis. In all, N = 1,018 adolescents, who had the permission of their parents (return rate = 44%), completed the questionnaires assessing EA, ER, and psychosocial adjustment within a 45-min school lesson. Participants were guided through the survey by trained instructors, who read each question aloud and responded to upcoming questions. Participants and participating classes had the opportunity to win individual shopping vouchers (worth 15–50€) and 50€ for the class fund, respectively.

The adolescents’ (56.6% female) mean age was 13.13 years (SD = 1.28, range = 11–18). The majority (54.0%) went to grammar school, 14.1% attended a comprehensive school, and 31.9% attended an intermediate secondary school. The distribution among the different grades was balanced (Grade 6, 25.0%; Grade 7, 28.3%; Grade 8, 24.6%; Grade 9, 22.1%). Most adolescents were born in Germany (98.2%). The Total Difficulties Score of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) for self-reports on psychosocial adjustment indicated a nonclinical sample (89.8% classified as normal).

2For other research purposes in this project, some SDQ items were slightly modified to produce parallel versions of the self- and parent-report measure (Vierhaus, Rueth, Buchberger, & Lohaus, 2018). However, changes to the self-report questionnaire used in this study were only minor.
Measures

Emotional awareness

The Emotion Awareness Questionnaire (EAQ) (Rieffe et al., 2008; German translation) is a self-report instrument to assess 9- to 16-year-olds’ EA. Respondents are asked to rate 30 items on a three-point scale (1 = not true, 2 = sometimes true, 3 = often true). Twenty items are inverted with respect to the description of the corresponding subscale, and thus the scoring for these items is reversed. The subscales are (1) Differentiating Emotions, (2) Verbal Sharing of Emotions, (3) Not Hiding Emotions, (4) Bodily Unawareness, (5) Attending to Others’ Emotions, and (6) Analyses of (Own) Emotions. Validated versions of the EAQ, which was originally designed in Dutch, are available in various languages (e.g., Italian, French, Spanish), but no German version was available. In compliance with other validation studies and according to the ITC Test Translation and Adaption Guidelines (Hambleton, 2001), the questionnaire was translated from English to German, and then back-translated into English. Inconsistencies were discussed and resolved by four experts, all fluent in German, English, or Dutch. The subscales of the original Dutch version (Rieffe et al., 2008) demonstrated good psychometric properties of scores in the secondary school sample, with Cronbach’s α values ranging from .74 to .77, and revealed a six-factor structure. Results of further validation studies supported the proposed six-factor structure and found Cronbach’s α values ranging between .65 and .81 (e.g., Camodeca & Rieffe, 2013; Lahaye et al., 2011; Lahaye, Luminet, van Broeck, Bodart, & Mikolajczak, 2010; Veiga, Oosterveld, Fernandes, & Rieffe, 2017). Psychometric properties of scores and factor analytical results of the German translation are reported in the “Results” section.

Emotion regulation

Adolescents’ ER was assessed with the Regulation of Emotions Questionnaire (REQ; Phillips & Power, 2007; German translation), which is suitable for adolescents 12 to 19 years old. The REQ has one unique and important feature that makes it of special interest for this study: Besides distinguishing between functional and dysfunctional strategies, it also distinguishes between intrapersonal (internal) and interpersonal (external) ER. As the different facets of EA can also refer to internal aspects (e.g., analyses of one’s own emotions) and external aspects (e.g., verbal sharing), the use of this questionnaire renders investigations of specific relations possible. On a five-point scale ranging from 1 (never) to 5 (always), adolescents indicated how often they use External Functional (EF, 6 items; e.g., “I take my feelings out on other people verbally”), Internal Functional (IF, 5 items; e.g., “I plan what I could do better next time”), and Internal Dysfunctional (ID, 5 items; e.g., “I harm or punish myself in some way”) ER strategies. Internal consistencies for the external subscales were acceptable (EF α = .74, ED α = .76) and comparable to a German study, using the same set of items (Kullik & Petermann, 2013). However, internal consistencies were rather low for the internal subscales (IF α = .54, ID α = .56). Content-related considerations, as well as item and factor analyses suggested deleting one item of the IF scale (“I review [rethink] my thoughts or beliefs”) and one item of the ID scale (“I keep the feeling locked up inside”), which slightly improved the internal consistencies (IF α = .55, ID α = .58). However, Cronbach’s alphas were still very low, which might indicate a heterogeneous scale or an undersized set of items, and should be considered when interpreting the results.

Psychosocial adjustment

The German self-report version of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997; Lohbeck, Schultheiß, Petermann, & Petermann, 2015, Vierhaus et al., 2018), an extensively validated screening measure for 11- to 17-year-old adolescents, was used to assess internalizing and externalizing symptoms and prosocial behavior. On a 3-point scale, adolescents indicated to what extent the 25 attributes are not true (0), somewhat true (1), or certainly true (2) for themselves. Originally, four problem-focused subscales with five items each were differentiated. For nonclinical samples, as included in this study, the use of broader problem-focused scales is possible (Goodman, Lamping, & Ploubidis, 2010): Internalizing Problems (α = .73; subsuming the primary subscales Emotional Symptoms and Peer Relationship Problems), and Externalizing Problems (α = .73; subsuming Hyperactivity/Inattention and Conduct Problems). Furthermore, Prosocial Behavior is included as an additional scale in the SDQ and assessed by five items (α = .69). Internal consistencies were in line with previous validation and large-scale studies using the secondary subscales of the English or German self-report version (Goodman et al., 2010; Rueth, Otterpohl, & Wild, 2017).

Statistical analyses

First, to test the proposed six-factor structure of the EAQ, a confirmatory factor analysis (CFA) was conducted through Mplus Version 8 (Muthén & Muthén, 1998–2017). A comparative fit index (CFI) close to .95, root mean square error of approximation (RMSEA) ≤ .06, and standardized root mean square residual (SRMR) ≤ .08 are assumed to indicate a good model fit (Hu & Bentler, 1999). Missing values, which were ≤ 1% for each item (overall = 0.003%), were handled by applying full information maximum likelihood (FIML) estimation. Initially, items were checked for univariate normality, detecting two items (5.2 and 5.4; Figure 1) that were extremely right-skewed, with scores above the

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*The German EAQ is available online at www.focusonemotions.nl/index.php/emotion-awareness-questionnaire-eaq.

* Differences were mainly found in items including the word ‘upset’, which has different possible translations in German. As Dutch and German are closely related languages, and the Dutch version is considered the original EAQ, inconsistencies were resolved by following the wording of the Dutch items.
threshold (skewness = 2, kurtosis = 7; Curran, West, & Finch, 1996). Hence, multivariate normality could not be achieved and the robust maximum likelihood estimator (MLR), which produces scaled chi-square values and is robust to nonnormality, was used for model estimation. The corresponding chi-square difference test was conducted for model comparisons (Muthén & Muthén, 2017). A total of 22 multivariate outliers were detected. However, as they were not caused by incorrect data entry or contradictory \( \Delta df \) responses, outliers remained in the final sample because they should be considered as part of the population. Instead, analyses were conducted with and without these outliers, producing almost identical results. Because partial metric invariance is a prerequisite for further investigations on gender differences in relationships between constructs, measurement invariance between girls and boys was examined for the EAQ measurement model. Afterward, means, standard deviations, and Cronbach’s \( \alpha \) of the EAQ subscales were computed using IBM SPSS Statistics 23. Furthermore, gender differences (analyses of latent mean differences) and associations with adolescents’ age (Pearson correlation coefficients) were examined.

Second, the concurrent validity was examined by computing two structural equation models examining associations of the six latent EAQ variables with ER (Model 1) and psychosocial adjustment (Model 2), respectively. In Model 1, the four REQ subscales External-Functional, External-Dysfunctional, Internal-Functional, Internal-Dysfunctional ER) were entered as dependent latent variables, to take measurement errors—indicated by the low internal
consistencies of the internal subscales—into account. In Model 2, the three SDQ subscales (internalizing problems, externalizing problems, and prosocial behavior) were entered as dependent manifest variables. To examine whether participants’ gender moderated these relations, analyses were conducted as multigroup analyses.

Results

Psychometric properties of the EAQ scores

Confirmatory factor analysis

Results of the initial model supported the proposed six-factor structure, \( \chi^2(390) = 1075.17, p < .001, \) CFI = .92, RMSEA = .042 (90% CI [.039, .045]), SRMR = .054. However, modification indices suggested that Items 3.3 and 3.4, as well as Items 5.2 and 5.4 (Figure 1), had excessively large correlated errors. This might be explained by very similar content and wording of these items, but also by high social desirability. By allowing the two error terms of the previously mentioned items to covary freely, the model fit significantly improved, \( \chi^2(388) = 957.98, p < .001, \) CFI = .93, RMSEA = .038 [.035, .041], SRMR = .053; \( \Delta \chi^2 = 78.14, \Delta df = 2, p < .001. \) Regarding the fit indices, RMSEA and SRMR indicated that the data fit the model well. However, the CFI was below, but still close to the preferred value of .95 (Hu & Bentler, 1999), and also above the previously suggested lower bound of .90 (Hu & Bentler, 1995). Considering all indices together, the overall fit can be evaluated as reasonable and in line with previous validation studies (e.g., Lahaye et al., 2011). The final model is presented in Figure 1. All factor loadings were significant, ranging from .43 to .81. The mainly significant factor correlations were both positive and negative, ranging from .12 to .71.

Measurement invariance

A multigroup CFA was conducted to examine metric invariance between boys and girls. The baseline model, in which all factor loadings were freely estimated, was compared to the more restrictive model assuming equal factor loadings for boys and girls. Because the baseline model fit significantly better (\( \Delta \chi^2 = 41.67, \Delta df = 24, p = .014 \)), full metric invariance was not found. Subsequently, one noninvariant factor loading (Item 1.7) was released, resulting in a model fit that was no longer significantly different from the baseline model (\( \Delta \chi^2 = 24.45, \Delta df = 23, p = .379 \)). Accordingly, partial metric invariance of the EAQ measurement model can be assumed. Moreover, invariance of the residual covariances of Items 3.3/3.4 and 5.2/5.4 was tested, finding that the covariance of Items 5.2/5.4 had to be released. The final model provided a reasonable fit, \( \chi^2(800) = 1371.90, p < .001, \) CFI = .93, RMSEA = .037 [.034, .041], SRMR = .059, and was used for further analyses of concurrent validity.

Descriptive statistics

Means, standard deviations, and internal consistencies (Cronbach’s \( \alpha \)) of the six subscales are presented in Table 1. Internal consistencies of the EAQ subscales were acceptable or good, ranging from \( \alpha = .74 \) (Verbal Sharing of Emotions) to \( \alpha = .81 \) (Differentiating Emotions and Not Hiding Emotions). Analyses of latent mean differences revealed that boys scored significantly higher on Differentiating Emotions (\( p < .01, g = .23 \)) and Bodily Unawareness (\( p < .001, g = .33 \)), but significantly lower on Not Hiding Emotions (\( p < .01, g = .21 \)) and Attending to Others’ Emotions (\( p < .001, g = 1.07 \)). Adolescents’ age was unrelated to the EAQ subscales, with the exception of Not Hiding Emotions (\( r = -.12, p < .001 \)).

Concurrent validity of the EAQ

Associations with ER (Model 1)

The initial unconstrained model, allowing all paths of the structural model to vary freely between boys and girls, fit the data significantly better, \( \chi^2(2197) = 3728.45, p < .001, \) CFI = .88, RMSEA = .037 [.035, .039], SRMR = .063; \( \Delta \chi^2 = 22.98, \Delta df = 15, p = .085. \) Furthermore, scalar measurement invariance—which is a prerequisite for analyzing mean differences—was examined, and partial scalar invariance was found (releasing intercepts of Items 1.3r, 1.5r, 2.3, 3.1r, 3.3r, 4.1r, 4.3, 4.5r, 6.4; \( \Delta \chi^2 = 22.98, \Delta df = 15, p = .085 \)). Analyses of observed composite differences across groups require full scalar measurement invariance. Because only partial scalar measurement invariance was found, latent mean differences between boys and girls were tested for significance within a multigroup CFA instead (Steinmetz, 2013).

| Table 1. Cronbach’s \( \alpha \), means, and standard deviations of the Emotion Awareness Questionnaire subscales. |
|---------------------------------|--------|--------|--------|--------|--------|--------|
| EAQ                            | No. of |
|                                | items  |        |        |        |        |        |
| Differentiating Emotions       | 7      | 2.39   | .43    | 2.35   | .44    | 2.44   | .41    | .81    |
| Verbal Sharing of Emotions    | 3      | 2.06   | .56    | 2.09   | .58    | 2.02   | .53    | .74    |
| Not Hiding Emotions           | 5      | 2.03   | .49    | 2.06   | .50    | 1.98   | .48    | .81    |
| Bodily Unawareness            | 5      | 1.91   | .54    | 1.80   | .51    | 2.05   | .53    | .79    |
| Attending to Others’ Emotions | 5      | 2.65   | .39    | 2.79   | .30    | 2.46   | .43    | .79    |
| Analyses of (Own) Emotions    | 5      | 2.10   | .45    | 2.11   | .43    | 2.08   | .47    | .76    |
|                                |        |        |        |        |        |        |        |        |
| Note. 1,000 < n < 1,017. EAQ = Emotion Awareness Questionnaire. Values shown in bold indicate significant gender differences (\( p < .05 \)). |
The initial unconstrained model, allowing all paths of the structural model to vary freely between boys and girls, provided a reasonable fit, $\chi^2(944) = 1561.32$, $p < .001$, CFI = .93, RMSEA = .036 [0.033, .039], SRMR = .056. This model fit the data significantly better ($\Delta \chi^2 = 33.89, \Delta df = 18, p = .013$) compared to the model constraining all paths to be equal between the two groups, $\chi^2(962) = 1595.21, p < .001$, CFI = .93, RMSEA = .036 [0.033, .039], SRMR = .057, which indicated meaningful gender differences. The inspection of modification indices suggested that the path of Differentiating Emotions predicting Internalizing Problems should be released, as it is significantly more negative for girls compared to boys. The less restrictive model was not significantly different from the unconstrained model, $\Delta \chi^2 = 19.38, \Delta df = 17, p = .037$. Nevertheless, two other paths (Attending to Others’ Emotions $\rightarrow$ Prosocial Behavior; Not Hiding Emotions $\rightarrow$ Externalizing Problems) had very high modification indices, and releasing these paths one after the other resulted in significant improvements of model fit in each step ($p < .05$). All other paths were not significantly different between the two groups. This model (with all but three paths constrained) fit the data reasonably well, $\chi^2(959) = 1568.88, p < .001$, CFI = .93, RMSEA = .035 [0.032, .038], SRMR = .056. Standardized path coefficients of the final structural model are presented in Table 3. All significant paths were in the expected direction: A higher EA was associated with more prosocial behavior and less internalizing and externalizing problems. Overall, meaningful associations for all but one EAQ subscale with the outcome measures (Verbal Sharing was not significantly associated with psychosocial adjustment) were found.

**Associations with psychosocial adjustment (Model 2)**

The initial unconstrained model, allowing all paths of the structural model to vary freely between boys and girls, provided a reasonable fit, $\chi^2(944) = 1561.32$, $p < .001$, CFI = .93, RMSEA = .036 [0.033, .039], SRMR = .056. This model fit the data significantly better ($\Delta \chi^2 = 33.89, \Delta df = 18, p = .013$) compared to the model constraining all paths to be equal between the two groups, $\chi^2(962) = 1595.21, p < .001$, CFI = .93, RMSEA = .036 [0.033, .039], SRMR = .057, which indicated meaningful gender differences. The inspection of modification indices suggested that the path of Differentiating Emotions predicting Internalizing Problems should be released, as it is significantly more negative for girls compared to boys. The less restrictive model was not significantly different from the unconstrained model, $\Delta \chi^2 = 19.38, \Delta df = 17, p = .037$. Nevertheless, two other paths (Attending to Others’ Emotions $\rightarrow$ Prosocial Behavior; Not Hiding Emotions $\rightarrow$ Externalizing Problems) had very high modification indices, and releasing these paths one after the other resulted in significant improvements of model fit in each step ($p < .05$). All other paths were not significantly different between the two groups. This model (with all but three paths constrained) fit the data reasonably well, $\chi^2(959) = 1568.88, p < .001$, CFI = .93, RMSEA = .035 [0.032, .038], SRMR = .056. Standardized path coefficients of the final structural model are presented in Table 3. All significant paths were in the expected direction: A higher EA was associated with more prosocial behavior and less internalizing and externalizing problems. Overall, meaningful associations for all but one EAQ subscale with the outcome measures (Verbal Sharing was not significantly associated with psychosocial adjustment) were found.

**Table 2.** Standardized path coefficients of the final structural model: Associations of the EAQ subscales with emotion regulation (Model 1).

<table>
<thead>
<tr>
<th>EAQ</th>
<th>Girls</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys</th>
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</thead>
<tbody>
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<td>Differentiating Emotions</td>
<td>-.21*</td>
<td>.21*</td>
<td>-.16*</td>
<td>-16*</td>
<td>.02</td>
<td>.02</td>
<td>-.49*</td>
<td>.52*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal Sharing of Emotions</td>
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<td>.21*</td>
<td>.11*</td>
<td>.11</td>
<td>.09</td>
<td>.05</td>
<td>-.05</td>
<td>.05</td>
<td></td>
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<tr>
<td>Not Hiding Emotions</td>
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<td>.50*</td>
<td>-.06</td>
<td>-.01</td>
<td>-.01</td>
<td>-.01</td>
<td>-.28*</td>
<td>-.20*</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>-.11*</td>
<td>-.08*</td>
<td>-.08*</td>
<td>.01</td>
<td>.01</td>
<td>-.33*</td>
<td>-.42*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attending to Others’ Emotions</td>
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<td>.23*</td>
<td>-.16*</td>
<td>-.16*</td>
<td>.02</td>
<td>.02</td>
<td>.02</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyses of (Own) Emotions</td>
<td>.12*</td>
<td>.14*</td>
<td>-.20*</td>
<td>-.20*</td>
<td>-.14*</td>
<td>-.14*</td>
<td>.54*</td>
<td>.56*</td>
<td>.03</td>
<td>.04</td>
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</table>

**Table 3.** Standardized path coefficients of the final structural model: Associations of the EAQ subscales with psychosocial adjustment (Model 2).

<table>
<thead>
<tr>
<th>EAQ</th>
<th>Girls</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
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<td>.00</td>
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<td>.20*</td>
<td>-.20*</td>
<td>.40*</td>
<td>-.30*</td>
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<tr>
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<td>.02</td>
<td>-.07</td>
<td>-.18*</td>
<td>-.18*</td>
<td>-.16*</td>
<td>.05</td>
<td>.16*</td>
</tr>
<tr>
<td>Not Hiding Emotions</td>
<td>.20*</td>
<td>.15*</td>
<td>.07</td>
<td>.16*</td>
<td>-.19*</td>
<td>-.05</td>
<td>.05</td>
<td>.05</td>
</tr>
<tr>
<td>Bodily Unawareness</td>
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<td>.02</td>
<td>-.01</td>
<td>-.02</td>
<td>-.02</td>
<td>-.04</td>
<td>.05</td>
<td>.05</td>
</tr>
<tr>
<td>Attending to Others’ Emotions</td>
<td>.44*</td>
<td>.35*</td>
<td>-.05</td>
<td>-.05</td>
<td>-.16*</td>
<td>-.15*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Values shown in bold indicate significant gender differences ($p < .05$), and the corresponding paths were released. All other paths were constrained to be equal between the groups, but standardized coefficients differ between boys and girls due to different standard errors.

* $p < .05$. 

$\Delta \chi^2 = 37.81, \Delta df = 24, p = .036$; compared to the constrained model, assuming all paths to be equal between boys and girls, $\chi^2(2221) = 3766.22, p < .001$, CFI = .88, RMSEA = .037 [.035, .039], SRMR = .064. This suggested that significant overall gender differences occurred. Modification indices indicated that model fit could be improved by releasing one path (Not Hiding Emotions $\rightarrow$ Internal Dysfunctional ER), which was significant for girls, but not for boys. This model (with all but one path constrained) was no longer significantly different from the unconstrained model, $\chi^2(2220) = 3750.43, p < .001$, CFI = .88, RMSEA = .037 [.035, .039], SRMR = .063; $\Delta \chi^2 = 22.42, \Delta df = 23, p = .435$. Standardized path coefficients of the final structural model are displayed in Table 2. All but three of the significant path coefficients were in the expected direction: Overall, more significant associations occurred for EA with external compared to internal ER strategies, mostly indicating that a higher EA is associated with more functional and less dysfunctional ER. However, three paths were significant in an unexpected direction: More differentiating emotions and bodily unawareness, which are thought to be beneficial for adolescents’ ER, were instead associated with less external functional ER. Also, more verbal sharing of emotions was associated with more, rather than less, external dysfunctional ER.
Discussion

The main aim of this study was to analyze the psychometric properties of scores on the German EAQ, especially by replicating the proposed six-factor structure, but also by assessing internal consistencies and means of the subscales. Furthermore, the concurrent validity was examined by analyzing associations of the EAQ with measures of ER and psychosocial adjustment. Overall, results provide evidence that the German version of the EAQ is a useful measure with good psychometric properties and significant relations with various outcome variables.

Psychometric properties

In general, the six-factor structure was replicated and the model provided reasonable fit indices, that were similar to findings from previous validation studies using the Dutch, Spanish, and French versions of the EAQ (Lahaye et al., 2011). All factor loadings were significant and strong or moderate in magnitude. The main significant factor correlations were both positive and negative, and a mixed pattern of weak, moderate, and strong associations was found. This suggested that there is no second-order factor or global EAQ score, but rather that EA is a multifaceted construct. The pattern of correlations among the six latent variables found in this study complies with findings from Rieffe et al. (2008) and other validation studies (Camodeca & Rieffe, 2013; Lahaye et al., 2010; although Bodily Unawareness was named Bodily Awareness in these studies, the scoring was identical). The consistent and seemingly contradictory finding that Bodily Unawareness is positively associated with Differentiating Emotions and Verbal Sharing, but negatively with Attending to Others’ Emotions and Analyses of Emotions reflects the ambiguous role of Bodily Unawareness. On the one hand, a decreased focus on physical signals might increase the ability to focus on the situation, rather than feeling overwhelmed, which possibly helps to deal with the emotion adequately (Rieffe et al., 2008). On the other hand, a decreased bodily awareness might reduce the willingness to face one’s own and others’ emotions, possibly because physical signals are perceived to a lesser extent and are then considered less important. Covariances between two pairs of error terms were allowed in the German EAQ model (Items 3.3/3.4 and Items 5.2/5.4; Figure 1). As the Spanish and Dutch EAQ models have been modified in the same way (Lahaye et al., 2011), this might be explained by a strong similarity and hence suggest a redundancy of single items. However, Cronbach’s α would decrease when such items were deleted. Furthermore, a high social desirability of the item contents (Items 5.2/5.4: caring about friends’ feelings; Items 3.3/3.4: hiding anger or upset) might also explain the large error correlations. Internal consistencies of all EAQ subscales were acceptable or good and (in most cases) even higher than the values found for the original EAQ (Rieffe et al., 2008) and in other validation studies (Camodeca & Rieffe, 2013; Lahaye et al., 2010; Lahaye et al., 2011; Veiga et al., 2017).

Results on associations of EA with age were surprising: The multiple age-related changes in adolescence (Meschke et al., 2012) and previously reported small but significant positive associations of age with Differentiating Emotions and Attending to Others’ Emotions (Lahaye et al., 2010), might suggest that adolescents’ EA improves with age. However, these findings could not be replicated, possibly because the sample of this study did not—unlike Lahaye et al. (2010)—include elementary school children. Regarding emotional competence, the developmental tasks in early and middle adolescence (12–17 years) are very similar (Denham, Wyatt, Bassett, Echeverria, & Knox, 2009), and improvements in EA might be very small. In fact, only Not Hiding Emotions was weakly associated with age, indicating that older adolescents tend to mask or hide their emotions more than younger adolescents do. This is in line with previous research, although the display of emotions varies between contexts (e.g., peers, parents; for an overview, see von Salisch, 2001). Given the mostly insignificant relations, age was not included in further analyses.

Analyses of mean differences between girls and boys revealed significant results on four scales. However, effect sizes indicated that only one difference is of importance (large effect): Girls in contrast to boys reported a higher attention to others’ emotions, which corresponds to results of previous studies using the EAQ (Lahaye et al., 2010; Rieffe & Camodeca, 2016). Findings are in line with research on gender differences in empathy, which requires this particular aspect of EA. Several studies found that girls score higher on empathy (e.g., Rieffe & Camodeca, 2016), especially when using self-reports and when the assessed behavior is obvious to participants (Eisenberg & Lennon, 1983). Hence, girls might strive for appearing more empathic to others and answer questions accordingly, potentially because empathy is an important characteristic of femininity (for an overview, see Eisenberg & Lennon, 1983). Concerning girls’ higher bodily awareness (small effect), research on gender differences in reporting somatic symptoms might provide useful explanatory approaches. In general, females report more somatic symptoms than do males. It has been suggested that boys learn to ignore bodily sensations as part of the socialization process because they are expected not to cry and to be “the stronger sex.” Furthermore, girls are more sensitive to pain, which might also apply to bodily sensations of emotions (for an overview, see van Wijk & Kolk, 1997). However, it should be mentioned that only two out of five item intercepts of this subscale were invariant between the two groups. Hence, the results should be interpreted with caution as this might indicate differences in responding to these items rather than true differences between boys and girls. Unexpectedly, even though the effect size was small, boys scored higher on Differentiating Emotions. This complies with previous findings (e.g., Lahaye et al., 2010; Rieffe & Camodeca, 2016), but is contrary to the general idea of girls being more aware of their emotions. However, Petrides and Furnham (2000) found that—in self-reports—boys overestimate (or girls underestimate) their ability to understand their emotions. This might also apply
to the self-reported ability of emotion differentiation. Because of the detected gender differences in means, it was further examined whether the two groups differ in their relation of the EAQ subscales with measures of ER and psychosocial adjustment. Results on this topic are discussed in the corresponding sections that follow.

Concurrent validity

The concurrent validity of an instrument (significant correlations with relevant outcome variables) is important for developmental research and practitioners. Therefore, meaningful indicators of adolescents’ healthy development and well-being have been assessed: (1) internal and external (dys-)functional ER, and (2) psychosocial adjustment, namely prosocial behavior, and internalizing and externalizing problems. Overall, significant associations were found, suggesting that the German EAQ is a useful measure for psychological research.

Associations with ER (Model 1)

Largely, a higher EA was associated with more functional and less dysfunctional strategies, which is in line with previous findings (e.g., Penza-Clyve & Zeman, 2002). All but one association of EA with external ER were significant. In comparison, only four meaningful associations with internal ER occurred, which, however, were larger on average. This might suggest that associations of EA with external ER are on a more global level, compared to more specific relationships with internal ER.

External-functional ER was significantly associated with all EAQ scales, whereas external-dysfunctional ER was significantly associated with all except Not Hiding Emotions. However, three associations in an unexpected direction were found: Differentiating Emotions and Bodily Unawareness were negatively associated with external-functional ER, which is characterized by seeking social support in emotionally challenging situations. The negative associations might be explained by a decreased necessity to involve others in the ER process in case of decreased bodily sensations or a high ability to distinguish between, for example, anxiety and sadness. However, as Differentiating Emotions and Bodily Unawareness were negatively associated with dysfunctional ER strategies, they still seem to be a desirable skill or trait that help to deal with emotions adequately. Furthermore, more Verbal Sharing was associated with more external-dysfunctional ER, which subsumes taking out feelings on objects and others, both physically and verbally. The positive association might be explained by an overlap of verbally expressing feelings (EA) and dysfunctional ways of venting one’s feelings (ER). Specifying emotion type and emotion intensity in future studies might help to better understand this relation.

In contrast to the numerous meaningful associations found for external strategies, there were less significant paths predicting internal strategies, hence all in the expected direction: Internal-functional ER was positively associated with Analyses of Emotions. Thus, understanding the reason for having an emotion might play a decisive role for developing functional ER strategies, such as cognitive problem solving or reappraisal. These strategies have been examined extensively in the past, and have been found to be important for healthy development (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Regarding internal-dysfunctional ER, significant negative associations with Differentiating Emotions and Bodily Unawareness occurred. This suggests that a decreased ability to distinguish between emotions and an increased perception of bodily sensations during an emotion experience reinforce internal persistence and ruminination. Furthermore, Not Hiding Emotions negatively predicted internal-dysfunctional ER. Interestingly, this association was significant for girls, but not for boys. Also, analyses of means showed that girls score higher on Not Hiding Emotions compared to boys (even though the effect was small). This suggests that girls, who generally seem to show their emotions more than boys do, are even more likely to use internal-dysfunctional strategies when hiding their feelings. Taken together, the numerous meaningful associations of all aspects of EA with different ER strategies indicate that EA should be considered in future research to better understand the underlying mechanisms of influence in the development of ER.

Associations with Psychosocial Adjustment (Model 2)

In general, significant associations in expected direction for all but one EAQ scale with measures of psychosocial adjustment were found. The exception here is Verbal Sharing of Emotions, which was not significantly associated with any outcome variable. However, similar to findings from Rieffe et al. (2008), more internalizing problems were associated with less Bodily Unawareness and Not Hiding Emotions. Hence, perceiving increased bodily sensations during an emotion experience and keeping feelings to oneself are unfavorable characteristics of children’s and adolescents’ EA. Furthermore, low levels of Differentiating Emotions predicted more internalizing symptoms. This is in line with the previous finding that emotion type clarity (which is comparable to emotion differentiation) is negatively associated with depression (Boden & Thompson, 2015). Overall, the pattern of significant relations is identical with previously mentioned findings on the association of EA with internal-dysfunctional ER. This is not surprising because internal-dysfunctional ER strategies (e.g., rumination) are strongly associated with internalizing problems (Aldao et al., 2010; Garnefski, Kraaij, & van Etten, 2005). Analyses on gender differences suggested that the relation of Differentiating Emotions with internalizing problems is substantially stronger for girls. Thus, it seems to be even more important for girls to be able to understand the exact type of emotion, rather than having an undefined and potentially overwhelming emotion experience that could result in a prolonged emotional state in which the emotion is no longer connected to the emotion-evoking situation (Rieffe & De Rooij, 2012). Previous studies found a stronger relation of emotional intelligence with somatic complaints for girls (Mavroveli
et al., 2007), but no gender effects for the variables used in this study have been reported so far.

Regarding externalizing problems, significant negative associations with Differentiating Emotions and Analyses of Emotions were found. Thus, the understanding of the specific type and reason for having this emotion again seems to protect adolescents, for example, from showing aggressive behavior. This is in line with previous findings (e.g., Petrides et al., 2006), and suggests that the association of EA and externalizing problems is not only of interest for clinical samples—in which a meaningful association has been found more consistently—but also for nonclinical samples. Furthermore, the negative association with Not Hiding Emotions was significant for boys, but not girls. Thus, when boys tend to show their emotions, they are also less likely to show externalizing symptoms. Given that externalizing problems are characterized by more direct aggression in boys (including a higher display of emotions), and more indirect aggression in girls (more hidden emotions; Card, Stucky, Sawalani, & Little, 2008), these results seem surprising. However, findings might suggest that boys, more than girls, benefit from showing their emotions (in a well-regulated way), instead of accumulating negative emotions resulting in an emotional outburst.

Besides relations with problem behavior, positive aspects of psychosocial adjustment, namely prosocial behavior, were examined. In accordance with previous findings (e.g., Rieffe & Camodeca, 2016), prosocial behavior was positively related with Attending to Others’ Emotions. This suggests that it is important to perceive others’ emotional states at first before acting in a prosocial way. Interestingly, girls did not only score higher on Attending to Others’ Emotions, but the relation with prosocial behavior was also significantly higher in this group. This might indicate that girls not only attend to others’ emotions more than boys do, but that they are also more likely to behave prosocially in the following, potentially due to social expectations toward females. However, as higher scores on empathy were mainly found in girls’ self-reports (Eisenberg & Lennon, 1983), future research should examine whether the gender effect can also be found based on proxy reports (e.g., peers, parents). Furthermore, Not Hiding Emotions was positively related with prosocial behavior, indicating that it is not only desirable to perceive others’ emotions, but also to display one’s own emotions to be able to show prosocial behavior.

**Strengths, limitations, and future research**

This study provides a reliable, valid, and economic German questionnaire to assess children’s and adolescents’ EA, which is an important variable for the development of ER deficits and psychopathology. A notable strength of this research is that the psychometric properties of scores and the concurrent validity of the German EAQ could be analyzed using data of a big sample. Furthermore, to the best of our knowledge, this study is the first to examine not only the association of the EAQ with internalizing problems (as most studies did), but also—as claimed by some authors (e.g., Rieffe & De Rooij, 2012)—relations with externalizing problems, prosocial behavior, and ER. However, there are also some limitations to be mentioned. First of all, data were cross-sectional. As this precludes causal interpretations on the relationship of the EAQ with other measures and does not allow analyses on retest reliability or the stability of EA in general, it is desirable to use longitudinal data in future studies. Second, only self-reports have been used. Even though self-reports might provide the most reliable information on entirely internal aspects of EA (e.g., differentiating emotions), future research could include reports of parents or teachers on observable aspects of EA (e.g., not hiding emotions). Third, results including ER should be interpreted with caution, as internal consistencies of the internal scales were rather low and, regarding the model investigating associations of EA with ER, the CFI indicated a poor model fit. Fourth, the nonresponse rate was relatively high (56%), which might result in a selective sample (e.g., higher motivation, higher socioeconomic status). Finally, the sample of this study only included secondary school children. Thus, further studies are necessary to analyze whether the German EAQ is also suitable for younger children.

**Conclusion**

Despite the limitations mentioned above, the German EAQ is a useful measure to assess children’s and adolescents’ EA, showing good psychometric properties of scores and concurrent validity. Several significant gender differences for associations of EA with ER and psychosocial adjustment were found. However, these relations were mainly significant for both gender groups (only differing in magnitude), indicating that the EAQ is suitable for detecting associations of EA with outcome measures in both boys and girls. EA has been suggested to be the initial point of emotion information processing (Lemerise & Arsenio, 2000) and ER (Gross, 2015), and also to be important for children’s and adolescents’ development. The EAQ might contribute to future research in this field as an economical, reliable, and valid questionnaire that is available in numerous languages.

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