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Measuring Gratitude in Youth:
Assessing the Psychometric Properties of Adult Gratitude Scales in Children and Adolescents

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Abstract

Before the developmental trajectory, outcomes, and related interventions of gratitude can be accurately and confidently studied among the youth, researchers must ensure that they have psychometrically sound measures of gratitude that are suitable for this population. Thus, considering that no known scales were specifically designed to measure gratitude in youth, this study aimed to answer an important question: Are the existing gratitude scales used with adults valid for use with youth? The current study is an empirical investigation, based on a large youth sample ($N = 1,405$) with ages ranging from 10 to 19 years old, of the psychometric properties of scores of the Gratitude Questionnaire-6 (GQ-6), the Gratitude Adjective Checklist (GAC), and the Gratitude Resentment and Appreciation Test (GRAT)-short form. Single-group and multiple-group confirmatory factor analyses indicated that the factor structures of these gratitude scales resemble those found with adults, and were invariant across age groups. Scores of all three gratitude scales revealed acceptable internal consistency estimates (i.e., $> .70$) across age groups. Results showed that while scores of all three gratitude scales were positively correlated with each other for 14-19 years old, GRAT-short form scores tended to display relatively low correlations with scores of the other two measures for younger children (10-13 years old). Further, the nomological network analysis showed that scores of all three gratitude scales were positively correlated with positive affect and life satisfaction scores across the age groups. The relationships with negative affect and depression scores, however, seemed dependent on the child's age. Pending results from subsequent research recommendations for researchers interested in studying gratitude in youth are offered.

Keywords: gratitude; scale; assessment; children; adolescents; positive psychology.

Measuring Gratitude in Youth:

Assessing the Psychometric Properties of Adult Gratitude Scales in Children and Adolescents

There has been a recent surge of gratitude research with adults (Emmons, 2007; Emmons & McCullough, 2004); however, research has just begun to explore gratitude in youth (Bono & Froh, 2009; Froh & Bono, 2008; Froh, Miller, & Snyder, 2007). Because gratitude focuses people's attention on their own welfare and others', its cultivation early in life may provide a bedrock for many positive developmental outcomes. Nevertheless, prior to accurate and confident study of its developmental trajectory, outcomes, and related interventions, researchers require psychometrically sound measures of gratitude that are suitable for children and adolescents. Thus, considering that no known scales were specifically designed to measure gratitude in youth, this study aims to answer an important question: Are the existing gratitude scales used with adults valid in research with youth?

The Psychology of Gratitude

Gratitude is the appreciation experienced by individuals when somebody does something kind or helpful for them. It has been defined more specifically as "a sense of thankfulness and joy in response to receiving a gift, whether the gift be a tangible benefit from a specific other or a moment of peaceful bliss evoked by natural beauty" (Emmons, 2004, p. 554). Gratitude has been conceptualized as an emotional trait, mood, or emotion (McCullough, Emmons, & Tsang, 2002). Trait gratitude, or the disposition toward gratitude, is a "life orientation toward noticing and appreciating the positive in the world" (Wood, Froh, & Geraghty, in press, p. 5). As a moral emotion, the experience and expression of gratitude promotes beneficial exchanges and relationships between people and the welfare of society at large (Haidt, 2003)—a view that has long been shared by religions and cultures across the globe (Emmons & Crumpler, 2000). Specifically, McCullough, Kilpatrick, Emmons, and Larson (2001) proposed that gratitude serves three moral functions. It serves as a *moral barometer* for beneficiaries by signaling the value of the relationship with the benefactor for the gift bestowed upon them; as a *moral reinforcer* by increasing the probability that the benefactor will bestow gifts again in the future; and as a *moral motive* by spurring beneficiaries to respond prosocially toward the benefactor or toward other people. McCullough et al. adduced evidence from an array of studies in personality, developmental, social, and evolutionary psychology in support of the *barometer* and *reinforcer* functions. Recent experiments have

also produced convincing evidence in support of the *moral motive* function (Bartlett & DeSteno, 2006; Tsang, 2006, 2007). Considered an important virtue for psychological and social functioning, gratitude is an emotion that instills a sense of meaning and connection to other people, communities, nature, or God (Emmons, 2004).

Investigating gratitude in youth is important for several reasons. First is because of its association with positive emotional functioning. Gratitude has been linked causally with positive affect (Emmons & McCullough, 2003; Froh, Kashdan, Ozimkowski, & Miller, 2009a). Positive affect, in terms of happiness, is related to superior life outcomes across a wide variety of domains (Lyubomirsky, King, & Diener, 2005). The regular experience of positive emotions can make people healthier and more resilient, fueling an upward spiral of optimal functioning, well-being, and development (Fredrickson, 2001; Fredrickson & Joiner, 2002). Gratitude, like other positive emotions, broadens problem-solving strategies (Fredrickson & Branigan, 2005) and can undo the aftereffects of negative emotions (Fredrickson, Mancuso, Branigan, & Tugae, 2000). Indeed, one reason resilient people bounce back from negative life events better is that they experience positive emotions such as gratitude regularly in response to stressful situations (Tugade & Fredrickson, 2004). Given its relationship to positive affect, gratitude may be used to engage this upward spiral (Fredrickson, 2004). For example, after compassion, gratitude was the second most common emotion experienced following the September 11 attacks in 2001. Such effects may occur with youth, too. For example, in an archival study of newspaper accounts of things children were thankful for, themes of gratitude for basic human needs (e.g., family, friends, and teachers) were found to increase after 9/11 (Gordon, Musher-Eizenman, Holub, & Dalrymple, 2004). Thus, gratitude appears to be a powerful resilience factor that may help people to cope with disaster (Fredrickson, Tugade, Waugh, & Larkin, 2003). It therefore is important for psychologists to measure and study its development in youth.

Second, gratitude is related to a wide range of adaptive social outcomes, including quality of relationships, generosity, compassion, and empathy (McCullough et al., 2002; Wood et al., in press). Social belonging is among the most essential human needs (Deci & Ryan, 2000). Caring ties can buffer people from adversity and pathology as well as enhance their health and well-being throughout life (Baumeister & Leary, 1995; House, Landis, & Umberson, 1988). Research with adults overwhelmingly indicates that gratitude is strongly related to healthy psychological and social functioning because it

focuses people on self-improvement and helps them maintain and build strong, supportive social ties (Emmons & McCullough, 2004). Evidence consistent with these effects, but among youth populations, has only recently started to emerge. For instance, among early adolescents, gratitude was found to be negatively related with physical symptoms and positively related with positive affect, perceptions of peer and familial social support, optimism, providing emotional support, and satisfaction with school, family, community, friends, and self (Froh, Yurkewicz, & Kashdan, 2009b) as well as life overall (Park & Peterson, 2006). Among late adolescents, gratitude was positively related with academic achievement, absorption in activities, and social integration (or the motivation to connect and contribute to one's society/community), and negatively related with envy, and materialism (Froh, Emmons, Card, Bono, & Wilson, in press). The most convincing evidence that gratitude can improve youth well-being comes from intervention studies (e.g., Froh, Sefick, & Emmons, 2008, Froh et al., 2009a, 2010). In one study (Froh et al., 2009a), children and adolescents low in positive affect who wrote and personally delivered a gratitude letter to a benefactor, compared to those who kept journals about daily events, reported greater gratitude and positive affect at post-treatment and greater positive affect at the 2-month follow-up. Thus, gratitude is related to important indicators of psychological and social functioning in youth as it is in adults.

The aforementioned studies suggest advances in our understanding of gratitude in adolescence. Grateful adolescents appear to be happy adolescents, and the effects of gratitude interventions with adolescents mirror those with adults (cf. Emmons & McCullough, 2003; Seligman, Steen, Park, & Peterson, 2004). As valuable as this research may be, psychologists must tread cautiously because the scales used in these studies were created for adults—not for youth. In other words, the validity of the research findings hinges upon the assumption that these adult gratitude measures can validly measure youth gratitude. This assumption has not been rigorously tested, and this is the primary purpose of our study. First, we discuss an important issue regarding the measurement of gratitude in youth and then review three existing adult gratitude scales. Next, we present an empirical study on the psychometric properties of scores of the three gratitude scales, based on a large youth sample ranging in age from 10 to 19 years old.

An Important Measurement Issue

Little research has addressed the development of gratitude in children and adolescents.

Psychoanalytic theorists, however, offer one portrait of the development of gratitude in children. For example, Klein (1957) asserted that gratitude first emerges in the earliest stages of infancy, but only if envy does not overpower its development. Envy, Klein maintained, originated during the development of the mother–child bond if the mother deprived the child of either physical nourishment via breast milk or emotional nourishment via love and care. The ultimate consequence for a child who develops envy in this way is being deprived of the opportunity to experience joy. The infant only experiences absolute enjoyment if the capacity for love is adequately developed—this enjoyment is thought to be the foundation for gratitude.

Like Klein (1957), others maintained that the origins of gratitude are found in the early attachment experience, as conceptualized by Bowlby (1969) (McAdams & Bauer, 2004). Empirical investigation, however, is needed to support this speculative view that the origin of gratitude is in infancy. Indeed, a criticism of Klein’s theory—as with psychoanalytic interpretations in general—is its lack of empirical support. Some argue that, “the clinical material she (Klein) adduced to support her ideas may be considered too idiosyncratic, too filtered through her own analytical perspective” (Komter, 2004, p. 202). Therefore, while some think infancy still remains a plausible developmental stage for the development of gratitude, others disagree. “Gratitude does not emerge spontaneously in newborns” (Emmons & Shelton, 2002, p. 468) but emerges from the child’s interactions with the environment over time.

Some scholars submit that the experience of gratitude increases as children mature (Baumgartner-Tramer, 1938; Graham, 1988). That is, older children report experiencing and expressing more gratitude compared to younger children. Gleason and Weintraub (1976) audio-taped conversations between 115 children (2-16 years of age) and adults on Halloween night aiming to elucidate language routines in child development. During three Halloweens and in two houses, a cassette recorder was hidden near the door and turned on every time the bell rang. Children were asked their age as they were leaving the house. The authors also accompanied two mothers and their children as they traveled from house to house to collect data on what mothers said to their children about receiving candy. In this “trick or treat” routine, children younger than six years of age thanked an adult for giving them candy noticeably less (21%) compared with 10 (83%) and 11-16 year olds (88%).

Developmental differences, especially cognitive-developmental differences, should give researchers pause when tempted to use adult gratitude measures with youth. Gratitude is a cognitively complex emotion with specific social-cognitive appraisals—intent of and cost to the giver and benefit for the receiver—necessary for its experience (Froh et al., 2010; Wood, Maltby, Stewart, Linley, & Joseph, 2008). Gratitude likely emerges between 7 and 10 years of age because it becomes more uniquely tied to these social-cognitive judgments as children age (Emmons & Shelton, 2002; Graham, 1988). To illustrate, after reading a vignette describing a new student in school picked to join the baseball team by the captain, 5- and 6-year olds were equally likely to give the captain a gift for their actions regardless of whether it was a kind gesture (intentional) or team rule (unintentional) (Graham, 1988). But 10- and 11-year olds were more likely to give the captain a gift only if they were intentionally selected. Furthermore, gratitude—measured by a single item on a rating scale consisting of five progressively smaller circles arranged horizontally across a response sheet—did not mediate the relation between the captain's behavioral motives and whether they gave a gift for 5- and 6-year olds, but it did for 10- and 11-year olds. Thus, gratitude better explains the relation between perceiving a benefactor's act as intentional and direct reciprocity as children age (Graham, 1988).

As children enter early adolescence and become less egocentric, the ability to empathize strengthens (Saarni, 1999). This ability may be the strongest developmental catalyst of gratitude, as it enables the antecedent social-cognitive appraisals needed to appreciate and reciprocate the conditions of benefit-giving situations (McCullough et al., 2001). Therefore, it is only after children's perspective taking ability develops enough for them to understand others' intentions to enhance their life satisfaction—which seems to be in place by age 10 (Park & Peterson, 2006)—that they may be able to start experiencing gratitude in similar ways as adults. It thus makes sense to begin examining the psychometric properties of adult gratitude scales in youth at the age of 10, when they are likely to be experiencing genuine gratitude and not just exhibiting expressions of thanks as a social script (Froh et al., 2007). Given this developmental pattern and the similarity of findings in the youth and adult gratitude literature, the factor structure for the gratitude scales in late childhood (10 years old) to late adolescent (19 years old) samples should resemble that which is found with adults.

Current Gratitude Measures

Gratitude Questionnaire – 6 (GQ-6)

Individuals can differ from each other in their general tendency or disposition to be grateful. Four qualities that distinguish highly grateful people from less grateful people are that they experience gratitude more intensely for a positive event, more frequently throughout the day, with greater density for any given benefit (i.e., grateful to more people), and across a wider span of experiences (e.g., family, friends, teachers, being included in a special event, having been defended by someone) (McCullough et al., 2002). Thus, gratitude can be conceptualized at several levels of analysis ranging from momentary affect to long-term dispositions (McCullough et al., 2002).

On the basis of the above four qualities of gratitude (i.e., intensity, frequency, density, and span), McCullough et al. (2002) developed the Gratitude Questionnaire-6 (GQ-6), a 6-item self-report scale for measuring a grateful disposition in adult populations. Sample items include, “I have so much to be thankful for,” “If I had to list everything that I felt grateful for, it would be a very long list,” and “I am grateful to a wide variety of people.” They found that a grateful disposition was associated positively with well-being, prosocial behaviors/traits, and religiousness/spirituality and negatively with envy and materialistic attitudes—findings that converged with observer ratings as well. With respect to the variables examined in this study, the GQ-6 demonstrated significant correlations with positive affect ($r = .31$), life satisfaction ($r = .53$), negative affect ($r = -.31$), and depression ($r = -.30$). Other researchers have also reported the validity of GQ-6 scores among adults (e.g., Kashdan, Mishra, Breen, & Froh, 2009; Wood, Joseph, & Maltby, 2009). Kashdan et al. found that gratitude was positively associated with greater relatedness and autonomy for women, but unrelated for men. Further, Wood et al. found that gratitude predicted psychological well-being above the Big-Five personality traits. The GQ-6 has also been translated into Chinese (Chen & Kee, 2008) with findings suggesting that gratitude positively predicts team satisfaction and life satisfaction and negatively predicts athlete burnout.

In three adult samples (undergraduate students in the U.S. and U.K.), however, we found that item 6, “Long amounts of time can go by before I feel grateful to something or someone,” had a relatively low factor loading compared with other GQ-6 items. More relevant to the present research, we also found that this item had an even lower factor loading in our youth sample (see Appendix A for details). Further,

during an informal interview several students from the present study stated that item 6 was “difficult to understand” and “very abstract.” We therefore conclude that item 6 is not appropriate for youth, and thus removed it from all subsequent analyses.

Gratitude Adjective Checklist (GAC)

A second self-report scale, the Gratitude Adjective Checklist (GAC; McCullough et al., 2002) is the sum of the affect adjectives grateful, thankful, and appreciative. The GAC can be used to measure gratitude as an emotion, mood, or disposition depending on the timeframe specified in the instructions (Froh et al., 2007). For example, it was used to measure gratitude as a mood by asking students to rate the degree to which they experienced each emotion “since yesterday” (Froh et al., 2009b).

GAC scores have demonstrated strong psychometric properties in an early adolescent population. During a 5-week period, Froh et al. (2008) obtained alphas ranging from .78 to .88. Convergent validity was also established in early adolescents, as gratitude had small to medium positive correlations with optimism ($r = .35$), contentment ($r = .21$), life satisfaction ($r = .37$), as well as domain specific life satisfaction of school ($r = .30$), community ($r = .22$), self ($r = .23$), and family ($r = .33$). Convergent validity was also found with overall positive affect ($r = .63$) (Froh et al., 2009b).

Using a sample of undergraduate students, the GAC has been found to be positively correlated with the GQ-6, forgiveness, spiritual transcendence, agreeableness, conscientiousness, extraversion, and openness and negatively correlated with neuroticism (McCullough et al., 2002). With respect to variables we examine in this study, the GAC demonstrated significant correlations with positive affect ($r = .57$), life satisfaction ($r = .38$), and negative affect ($r = -.23$) (McCullough et al., 2002). Kashdan, Uswatte, and Julian (2006) have also reported the validity of GAC scores among adults. In their study, combat veterans with post-traumatic stress disorder (PTSD) reported significantly lower dispositional gratitude, compared to those without PTSD. Further, controlling for PTSD severity and dispositional negative and positive affect, dispositional gratitude predicted greater levels of daily positive affect, percentages of pleasant days over a 2-week period, instances of daily involvement in intrinsically motivating activities, and greater levels of daily self-esteem for veterans with PTSD, but not for veterans without PTSD.

Gratitude, Resentment, Appreciation Test-short form (GRAT-short form)

A third self-report scale which measures dispositional gratitude—the Gratitude, Resentment, Appreciation Test, 16-item short version (GRAT-short form; Thomas & Watkins, 2003)—measures adults' sense of abundance in life and appreciation of others. According to Thomas and Watkins' exploratory factor analysis (EFA), the GRAT-short form has 3 factors: (a) lack of a sense of deprivation (LOSD; 6 items), (b) simple appreciation (SA; 6 items), and (c) appreciation for others (AO; 4 items). Sample items are: "I really don't think that I've gotten all the good things that I deserve in life" (reverse-scored), "I think it's important to appreciate each day that you are alive," and "I couldn't have gotten where I am today without the help of many people," for the 3 factors, respectively.

Thomas and Watkins (2003) reported, based on an undergraduate sample, that gratitude, as measured by the GRAT-short form, was positively correlated with the GQ-6 ($r = .82$), life satisfaction ($r = .65$), and positive affectivity ($r = .47$) and negatively correlated with current depression ($r = -.43$), number of past episodes of depression ($r = -.35$), and negative affectivity ($r = -.37$). Diessner and Lewis (2007) reported, based on an undergraduate sample, that gratitude, as measured by the GRAT-short form, was positively correlated with spiritual transcendence and negatively correlated with materialism. Further, in an undergraduate sample, scores of the GRAT-short form demonstrated good internal consistency ($\alpha = .86$) and had medium to strong positive correlations with scores of life satisfaction ($r = .70$), positive affectivity ($r = .41$), self-esteem ($r = .39$), and perceived social support ($r = .44$) (Sprangler, 2010). Because the GRAT-short form was recently developed and its factor structure has not been firmly established, we obtained data from these authors on the GRAT-short form based on a large undergraduate student sample ($N = 681$) to address this issue. Our own EFA and confirmatory factor analysis (CFA) confirmed the 3-factor structure with all items loading on their respective factors, with one exception. Item 2, "Life has been good to me," loaded lowly on all three factors. One possible reason was that its meaning was too vague. Thus, this item was removed from subsequent analyses. A CFA on the remaining 15 items yielded acceptable fit: $\chi^2(87, N = 681) = 462.65, p < .01$, non-normed fit index (NNFI) = .95, comparative fit index (CFI) = .96, incremental fit index (IFI) = .96, and standardized root mean square residual (SRMR) = .05. The generalizability of this factor structure was tested among the youth in the present study.

Current Investigation

A major gap in the gratitude in youth literature involves evaluating the validity of the GQ-6, GAC, and GRAT-short form scores with children and adolescents. Several studies have used the GQ-6, GAC, and GRAT-short form to measure gratitude in youth, and all have reported adequate internal consistencies. Nevertheless, researchers have failed to conduct empirical studies of the validity of scores of these scales, including assessments of their validity across multiple age groups. This is problematic because meaningful research on the nature, development, and consequences of individual differences in gratitude among children and youth requires psychometrically sound measures of gratitude. Further, such research findings can influence education practices and programs and public policy. Although originally developed for use with adults, it seems plausible that scores of these measures could all demonstrate acceptable psychometric properties given their conceptual simplicity. Therefore, the purpose of this study was thus to evaluate the psychometric properties of the GQ-6, GAC, and GRAT-short form scores across a wide age range. We have chosen the current approach rather than attempting to develop and validate a new gratitude measure for youth for two reasons. First, given the rapidly growing body of empirical research on gratitude among youth, all of which used adult gratitude measures, we felt it imperative and timely to investigate the appropriateness of this research practice from the psychometric perspective. Second, because our sample covers a wide range of age groups (from 10 to 19 years old), our investigation may shed light on the boundary conditions (in terms of specific age limit) of adult gratitude measures when used with youth. Such information may strategically help scholars interested in developing new youth gratitude measures to better focus their scale development effort on specific age groups.

To assess the validity of the three scale scores, we developed four major hypotheses. First, because gratitude does not consistently emerge until age 10, and research findings on the relation between gratitude and well-being mirror those of adults, we hypothesized that the factor structures for the GQ-6, GAC, and GRAT-short form would resemble those found with adults, and would be invariant across students of ages 10 to 19. Second, across the same age groups, we expected GQ-6, GAC, and GRAT-short form scores to demonstrate adequate internal consistency (i.e., $\geq .70$), for research purposes. Third, we hypothesized that scores of the three gratitude measures would have at least

moderate positive correlations with each other (i.e., convergent validity) across ages 10 to 19. Fourth, we hypothesized that scores of the three gratitude measures would have at least moderate positive correlations with positive affect and life satisfaction, and negative correlations with negative affect and depression (i.e., meaningful relations with related constructs in the nomological network) across ages 10 to 19.

Method

Participants

Samples 1 and 2 (below) were from the same affluent school district (district median household income = \$94,339; state median household income = \$43,393) from a city in Long Island, New York.

Sample 1. Participants were 411 middle school students (mean age = 11.57 years, $SD = .86$, range = 10-13 years). Students were in grades 6 (48.4%), 7 (29.0%), and 8 (21.4%). Most were Caucasian (71.5%), about half were female (52.1%), and 11.8% reported receiving special education services.

Sample 2. Participants were 994 high school students (mean age = 15.67 years, $SD = 1.20$, range = 14-19 years). Students were in grades 9 (27.7%), 10 (24.9%), 11 (25.7%), and 12 (21.4%). Most were Caucasian (63.8%), about half were male (50.5%), and 11.7% reported receiving special education services.

Procedure

Students enrolled in curriculum that all students receive (e.g., English) were sought for participation to increase the odds of obtaining representative samples of the schools. The students were recruited by the first author, who was a school psychologist in the same district at the time. Upon contacting the principal of the schools, he asked for permission to distribute parental consent forms and collect data after receiving passive parental consent and active student assent. For sample 1, of the 428 students in the school, 15 were absent the day of data collection and two were denied consent to participate in the study. For sample 2, of the 1,034 students in the school, 35 were absent the day of data collection and five were denied consent to participate in the study. Data were collected during fall 2006 (sample 1) and spring 2007 (sample 2). All students in the school were invited to participate. One week prior to data collection, the first author reviewed all measures and instructions with the vice principal who

then reviewed them with the teachers. Teachers were given a script for introducing the study to students to ensure uniformity and to control for potential demand characteristics. Teachers administered questionnaires in classrooms and remained there in case students had questions. Teachers were given 25-dollar gift cards for helping out with survey administration; students did not receive compensation for participating. Measures were counterbalanced via a Latin square to control for order effects.

Measures

GQ-6 (McCullough et al., 2002). The GQ-6 is a 6-item measure of gratitude using a Likert scale from 1 (strongly disagree) to 7 (strongly agree). GQ-6 scores have demonstrated good internal consistency ($\alpha = .82$) and a robust one-factor solution in adult samples (McCullough et al., 2002). We replaced “grateful” with “thankful” in the items because our clinical experience suggests youth use the latter more often when describing their experience as a receiver of a benefit. As mentioned earlier, we removed the last item of GQ-6 from subsequent analyses.

GAC (McCullough et al., 2002). The GAC is a 3-item measure of gratitude using a Likert scale from 1 (very slightly or not at all) to 5 (extremely) followed each item. GAC scores have demonstrated good internal consistency in adult samples ($\alpha = .87$) (McCullough et al., 2002). Students in the present study were asked to rate the amount they experienced each feeling “during the past few weeks.”

GRAT-short form (Thomas & Watkins, 2003). The GRAT-short form is a 16-item measure of gratitude using a Likert scale from 1 (I strongly disagree) to 9 (I strongly agree with the statement). Internal consistency is excellent in adult samples ($\alpha = .92$), as is convergent and discriminant validity (Thomas & Watkins, 2003). As mentioned earlier, we removed one item from this scale, resulting in 15 items.

Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999). The PANAS-C was used to assess positive (PA) and negative affect (NA). It consists of 15 positive (e.g., happy, cheerful) and 15 negative (e.g., sad, frightened) affect adjectives. A Likert scale from 1 (very slightly or not at all) to 5 (extremely) followed each item. Internal consistency is strong for both PA scores ($\alpha = .90$ for the scale development sample and $.89$ for the replication sample) and NA scores ($\alpha = .94$ for the scale development sample and $.92$ for the replication sample) (Laurent et al., 1999). Internal consistency was also established with PA scores ($\alpha = .78$) and NA scores ($\alpha = .81$) in an Australian

sample of children and adolescents (Wilson, Gullone, & Moss, 1998). PA and NA scores also have good convergent and discriminant validity with existing measures of childhood anxiety and depression (Laurent et al., 1999). Specifically, convergent validity was established between the NA scale and the Children's Depression Inventory (CDI; Kovacs, 1980-1981, 1992) ($r = .60$) as well the State-Trait Inventory for Children (STAIC; Spielberger, 1973) ($r = .68$), a self-report anxiety scale for children. Further, the PA scale demonstrated a negative correlation with both the CDI ($r = -.42$) and STAIC ($r = -.30$) (Laurent et al., 1999). Students were asked to rate the amount they experienced each feeling "during the past few weeks." PA scores demonstrated good internal consistency in both sample 1 ($\alpha = .86$) and sample 2 ($\alpha = .87$), as did NA scores (sample 1 $\alpha = .82$, sample 2 $\alpha = .89$).

The Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS; Seligson, Huebner, & Valois, 2003). The BMSLSS is a 5-item measure using a response scale ranging from 1 (terrible) to 7 (delighted) that assesses overall life satisfaction summed across multiple domains (family life, friendships, school experience, self, and living environment). The scale is conceptualized to assess general life satisfaction in children and youth (ages 8 -18). Coefficient alphas have been reported as ranging from .68 (elementary students) to .75 (secondary students). A unidimensional factor structure has been demonstrated, where all items loaded on one factor, as well as significant correlations with other measures of life satisfaction, including the Students' Life Satisfaction Scale ($r = .70$) (Seligson, Huebner, & Valois, 2005). A sample item from the BMSLSS is, "I would describe my satisfaction with my friends as _____." Internal consistency has been reported to be acceptable with middle school students ($\alpha = .75$) and good with high school students ($\alpha = .81$). The BMSLSS correlates significantly with other measures of youth well-being (Seligson et al., 2003). Specifically, BMSLSS scores demonstrated a positive correlation with positive affect ($r = .43$) and a negative correlation with negative affect ($r = -.27$) (Seligson et al., 2003). Further, the domain specific items from the BMSLSS demonstrated strong positive correlations with their respective factors from the Multidimensional Students' Life Satisfaction Scale and were as follows across the five domains of life satisfaction: .47 (self), .52 (friendships), .53 (school experience), .55 (family life), and .60 (living environment). BMSLSS scores demonstrated acceptable internal consistency in both sample 1 ($\alpha = .78$) and sample 2 ($\alpha = .72$) in the present study.

Center for Epidemiologic Studies Depression Scale for Children (CES-DC; Weissman, Orvaschel, & Padian, 1980). The CES-DC is a 20-item measure of depression using a Likert scale ranging from 1 (not at all) to 4 (a lot). Test-retest reliability has been established (Faulstich, Carey, Ruggiero, Enyart, & Gresham, 1986), and CES-DC scores have demonstrated good internal consistency ($\alpha = .88$) in a sample of 156 youth ranging in age from 8 to 17 years (Brage, Merdith, & Woodward, 1993). The CES-DC demonstrated a negative correlation with the Children's Depression Inventory (.61) (CDI; Kovacs, 1992) (Faulstich et al., 1986) and the Social Adjustment Scale Self-Report (.75) (SAS-SR; Weissman & Bothwell, 1976) (Weissman et al.). A sample item is, "I felt down and unhappy." CES-DC scores demonstrated good internal consistency in sample 1 ($\alpha = .84$) and sample 2 ($\alpha = .89$) in the present study.

Results

Factorial Validity

The combined sample consisted of youth with age ranging from 10 to 19 years old ($N = 1,405$). Although it would have been ideal to form one subgroup for each age year with approximately equal sample size, sample sizes were substantially smaller at both extreme ends of the age distribution. To ensure approximately equal sample sizes, we formed the following six age groups: (a) Age 17-19 ($n = 274$); (b) Age 16 ($n = 260$); (c) Age 15 ($n = 249$); (d) Age 14 ($n = 211$); (e) Age 12-13 ($n = 194$); and (f) Age 10-11 ($n = 217$).

We first conducted several single-group CFAs to examine whether the factor structures of the three gratitude measures identified in adult populations fit our youth groups adequately. CFAs were done using LISREL 8 (Jöreskog & Sörbom, 1996). The following goodness-of-fit indices were used to evaluate model fit: NNFI, CFI, IFI, and SRMR. According to several methodologists (e.g., Bollen, 1989; Browne & Cudeck, 1993; Jöreskog & Sörbom, 1996; Tanaka, 1993), NNFI, CFI, and IFI values above .90, and SRMR value less than .08 are considered acceptable.

Table 1 presents the results of these single-group CFAs including model fit indices and standardized factor loadings for each of the three gratitude measures and within each of the six age groups. For the GQ-6, the single-factor structure fit the six age groups well, with the 17-19 year olds showing relatively worse fit than the other five groups, but even for this group the model fit, overall, should

be considered acceptable. Factor loadings for GQ-6 items were all significant and large, with generally comparable magnitude across the six age groups. Item 3, however, appeared to have quite varied factor loadings across age groups, an issue we would investigate further subsequently. For the GAC, the single-factor structure fit all six age groups perfectly. This was because with only 3 items the hypothesized models were saturated, which guaranteed a perfect fit. Factor loadings for GAC items were all significant and large, with comparable magnitude across the six age groups. For the GRAT short-form, the hypothesized 3-factor structure fit various age groups well, with the 15 year olds and the 12-13 year olds showing relatively worse, yet acceptable fit. Factor loadings for GRAT short-form items were all significant and large, with generally comparable magnitude across the six age groups. Item 5 of the LOSD dimension and item 4 of the AO dimension, however, had quite varied factor loadings across age groups, an issue we would look at further in subsequent analyses.

Next, we conducted a series of multiple-group CFAs to investigate the extent to which the factor structures of the three gratitude measures were invariant across the six age groups, respectively. For each gratitude measure, the same multiple-group CFA procedure was followed (c.f., Reise, Widaman, & Pugh, 1993; Vandenberg & Lance, 2000). First, the least restrictive model, or the congeneric model, tested whether the six age groups had the same factor loading pattern. This was done by imposing the same factor loading pattern across age groups. Next, a more restrictive model, or the tau-equivalent model, tested whether the six age groups had the same factor loading pattern and equivalent factor loadings. This was done by additionally imposing equality constraints on corresponding factor loadings across groups. Finally, the most restrictive model, or the parallel model, tested whether the six age groups had the same factor loading pattern, equivalent factor loadings, and equivalent latent factor covariance matrices and error covariance matrices. This was done by additionally imposing equality constraints on latent factor covariance and error covariance matrices across age groups.

Given the nesting nature of the three progressively restrictive models, the χ^2 difference test is usually recommended to assess whether model fit worsens significantly from the less restrictive to the more restrictive models (Reise et al., 1993). Because the χ^2 test is sensitive to sample size, however, and because our sample size was large, we also looked at changes in alternative model fit indices that are less sensitive to sample size such as the NNFI, CFI, IFI, and SRMR. Little (1997) suggested .05, whereas

Rahim and Magner (1995) proposed .04 as the general cutoff for changes in these alternative fit indices. Although it is ideal to show the support for the parallel model, in most cases it is sufficient to demonstrate the support for the tau-equivalent model to conclude factor structure invariance (Vandenberg & Lance, 2000).

Table 2 presents multiple-group CFA results. For the GQ-6, the congeneric model fit the data adequately. This means these youth groups had the same factor loading pattern in the GQ-6. The tau-equivalent model fit the data reasonably well. Although the χ^2 difference test comparing the congeneric model against the tau-equivalent model was significant: $\Delta\chi^2$ ($\Delta df = 20$) = 44.20, $p < .01$, changes in alternative model fit indices were smaller than recommended cutoffs. Thus, these youth groups had overall equivalent factor loadings. Because earlier analyses, however, indicated that item 3 had quite varied factor loadings across age groups, we tested a partial tau-equivalent model in which only item 3's factor loadings were constrained to be equal across age groups. As can be seen in Table 2, the partial tau-equivalent model fit the data quite well. The χ^2 difference test comparing the congeneric model against the partial tau-equivalent model was significant: $\Delta\chi^2$ ($\Delta df = 5$) = 22.41, $p < .01$; however, changes in alternative model fit indices were minimal. Thus, constraining item 3 factor loadings to be equal across age groups did not result in substantially worse model fit. Finally, the parallel model yielded mixed model fit results: While NNFI, CFI, and IFI indicated acceptable fit, SRMR clearly suggested a poor fit. The χ^2 difference test comparing the tau-equivalent model against the parallel model was significant: $\Delta\chi^2$ ($\Delta df = 30$) = 214.93, $p < .01$. In addition, changes in CFI, IFI, and SRMR exceeded the recommended cutoffs. Thus, constraining latent factor covariance matrices and error covariance matrices to be equal across age groups resulted in substantially worse model fit. Based on the above results, we conclude that these youth groups had the same factor loading pattern and equivalent factor loadings in the GQ-6.

For the GAC, the congeneric model fit the data perfectly because the model was saturated. This means these youth groups had the same factor loading pattern in the GAC. The tau-equivalent model fit the data well. The χ^2 difference test comparing the congeneric model against the tau-equivalent model was not significant: $\Delta\chi^2$ ($\Delta df = 10$) = 13.30, $p > .20$; furthermore, changes in alternative model fit indices were minimal. Thus, constraining factor loadings to be equal across age groups did not result in substantially worse model fit. The parallel model yielded mixed model fit results: While NNFI, CFI, and IFI

indicated acceptable fit, SRMR clearly suggested a poor fit. The χ^2 difference test comparing the tau-equivalent model against the parallel model was significant: $\Delta\chi^2 (\Delta df = 20) = 149.15, p < .01$. In addition, changes in NNFI, CFI, IFI, and SRMR all exceeded the recommended cutoffs. Thus, constraining latent factor covariance matrices and error covariance matrices to be equal across age groups resulted in substantially worse model fit. Based on the above results, we conclude that these youth groups had the same factor loading pattern and equivalent factor loadings in the GAC.

For the GRAT-short form, the congeneric model fit the data adequately. This means these youth groups had the same factor loading pattern in the GRAT-short form. The tau-equivalent model fit the data reasonably well. The χ^2 difference test comparing the congeneric model against the tau-equivalent model was not significant: $\Delta\chi^2 (\Delta df = 60) = 51.92, p > .10$; furthermore, changes in alternative model fit indices were minimal. Thus, these youth groups had overall equivalent factor loadings. Following up with earlier analysis indicating that LOSD item 5 and AO item 4 had quite varied factor loadings across age groups, we also tested two partial tau-equivalent models to examine the factor loading equivalence of these two items, respectively. As can be seen in Table 2, both partial tau-equivalent models fit the data reasonably well. The χ^2 difference tests comparing the congeneric model against the partial tau-equivalent models involving equal LOSD item 5 was not significant: $\Delta\chi^2 (\Delta df = 5) = 2.11, p > .10$. The χ^2 difference tests comparing the congeneric model against the partial tau-equivalent models involving equal AO item 4 was significant: $\Delta\chi^2 (\Delta df = 5) = 11.34, p < .05$. For both partial tau-equivalent models, however, changes in alternative model fit indices were minimal. Thus, these two items had equal factor loadings across age groups. Finally, the parallel model yielded poor to border-line fit. The χ^2 difference test comparing the tau-equivalent model against the parallel model was significant: $\Delta\chi^2 (\Delta df = 105) = 779.09, p < .01$. In addition, changes in CFI, IFI, and SRMR exceeded the recommended cutoffs. Thus, constraining latent factor covariance matrices and error covariance matrices across age groups resulted in substantially worse model fit. Based on the above results, we conclude that these youth groups had the same factor loading pattern and equivalent factor loadings in the GRAT-short form.

To summarize, single-group CFA results indicated that the factor structures of the GQ-6, GAC, and GRAT-short form identified in our youth sample resemble those found with adults. Multiple-group CFA results suggested that these youth groups had the same factor loading pattern and equivalent factor

loadings in these three gratitude measures. Although a couple of items had quite varied factor loadings across age groups, additional analyses showed that these items had statistically equivalent factor loadings across age groups. Together, the above findings supported the first hypothesis.

Internal Consistency

As can be seen in Table 3, across all age groups the GQ-6, GAC, and GRAT-short form scores demonstrated acceptable internal consistency for research purposes, as alphas were all above .70. Alpha for the subscales in the GRAT-short form was the following for the different age groups: 17-19 year olds, LOSD ($\alpha = .83$), SA ($\alpha = .73$), AO ($\alpha = .73$); 16 year olds, LOSD ($\alpha = .81$), SA ($\alpha = .75$), AO ($\alpha = .71$); 15 year olds, LOSD ($\alpha = .82$), SA ($\alpha = .73$), AO ($\alpha = .70$); 14 year olds, LOSD ($\alpha = .79$), SA ($\alpha = .74$), AO ($\alpha = .77$); 12-13 year olds, LOSD ($\alpha = .73$), SA ($\alpha = .76$), AO ($\alpha = .77$); 10-11 year olds, LOSD ($\alpha = .76$), SA ($\alpha = .75$), AO ($\alpha = .70$). Thus, supporting the second hypothesis, the GQ-6, GAC, and GRAT-short form seem to be reliable measures in children and adolescents ranging from 10 to 19 years old.

Convergent Validity

We then examined the correlations among the GQ-6, GAC, and GRAT-short form (see Table 4), expecting to find at least moderate positive correlations across all age groups. Results showed that for 14-19 year olds the GQ-6, GAC, and GRAT-short form scores demonstrated medium to strong positive correlations with each other. These correlations, however, diverged somewhat for 10-11 and 12-13 year olds. Specifically, while the GQ-6 and GAC scores continued to demonstrate strong positive correlations with each other for 10-11 and 12-13 year olds, the GRAT-short form scores had small to medium positive correlations with the GQ-6 and GAC scores for 10-11 and 12-13 year olds. Thus, whereas the GQ-6 and GAC seem to be measuring the same thing across the age groups, the GRAT-short form seems to be measuring the same thing as the GQ-6 and GAC in 14-19 year olds, but something different in 10-13 year olds. Thus, the third hypothesis received strong support for 14-19 year olds, but weaker support for 10-13 year olds.

Nomological Network Analysis

Next, we looked at the correlations between the GQ-6, GAC, and GRAT-short form and related constructs in the nomological network. We first examined correlations between these three gratitude scales and two positive indicators of well-being (i.e., PA and life satisfaction) expecting to find at least

moderate positive relations. According to Table 4, GQ-6 and GAC scores demonstrated medium positive correlations with PA and life satisfaction scores across all age groups. GRAT-short form scores, however, had medium positive correlations with PA and life satisfaction scores for 14-19 year olds, significant yet small correlations for 12-13 year olds, and non-significant correlations for 10-11 year olds.

We then examined correlations between these three gratitude scales and two negative indicators of well-being (i.e., NA and depression) expecting to find at least moderate negative relations. As can be seen in Table 4, GQ-6 scores had medium negative correlations with NA scores for 12-19 year olds; the correlation was non-significant for 10-11 year olds. GAC scores had a small, negative correlation for 16 year olds, and a medium negative correlation with NA scores for 10-11 year olds, but it had a non-significant correlation in the rest of the research sample. GRAT-short form scores had medium negative correlations with NA scores for 14-19 year olds; the correlation was non-significant for 10-13 year olds. GQ-6 scores demonstrated medium negative correlations with depression scores for all age groups. GAC scores had medium negative correlations with depression scores for all age groups, except for the 12-13 year olds, for whom the correlation was non-significant. Finally, GRAT-short form scores demonstrated medium negative correlations with depression scores for 14-19 year olds, but it had a non-significant correlation for 12-13 year olds and an unexpected significantly positive correlation for 10-11 year olds.

Together, these data suggest that scores of all three gratitude scales generally demonstrated positive relations with positive indicators of well-being across 10-19 year olds. When considering the negative indicators of well-being, however, the most consistent relations tended to be with the GQ-6 for 10-19 year olds and the GRAT-short form for 14-19 year olds; the GAC demonstrated inconsistent patterns. Thus, the fourth hypothesis was only partially supported.

Discussion

Although some authors have written about assessing gratitude in youth (Bono & Froh, 2009; Froh et al., 2007; Froh & Bono, 2008), this is the first known empirical attempt to establish the psychometric properties of the three most widely used measures of gratitude in this population: the GQ-6, GAC, and GRAT-short form. Using single-group and multiple-group CFAs, we found that the factor structures of these gratitude scales resemble those found with adults (e.g., McCullough et al., 2002), and were invariant across age groups (10-19 years old). Scores of all three gratitude scales had acceptable internal

consistency estimates across age groups. With respect to convergent validity, results showed that while scores of all three gratitude scales were positively correlated with each other for 14-19 years old, GRAT-short form scores tended to display low correlations with scores of the other two measures among younger children (10-13 years old), suggesting that the GRAT-short form is measuring something different compared to the GQ-6 and GAC among pre-adolescents. Further, the nomological network analysis evidence showed that scores of all three gratitude scales were positively correlated with PA and life satisfaction scores across the age groups (10-19 years old) with magnitudes resembling that found with adult samples, especially for 14-19 year olds. The relationships with NA and depression scores, with magnitudes generally resembling that found in adult samples, however, seemed dependent on the child's age. For example, when the relation between NA and gratitude (as measured by the GAC) is considered, such a relation would only emerge for 10-11 and 16 year olds. But if gratitude were measured by the GQ-6, such a relation would only emerge for youth 12-19 year olds. The weaker or non-existent link between NA and gratitude scores in these earlier ages may have something to do with gratitude not yet solidifying enough to counter the negative emotions that may correspond to the temporary dip in self-esteem observed in middle school students (Berk, 2007).

Pending results from subsequent research, we offer the following recommendations for researchers interested in studying gratitude in youth. First, preliminary support is provided for the use of the GQ-6, GAC, and GRAT-short form with 14-19 year olds, with one small exception: the GAC demonstrated lower correlations with NA in this study. Second, researchers who would like to use the GQ-6 to measure gratitude in youth should seriously consider excluding item 6 given its low factor loading, apparent abstractness, and some youth reporting it difficult to understand. Third, researchers should not use the GRAT-short form with students in the 10-13 year age range. While there appear to be pros and cons with using either the GQ-6 or GAC, this study suggests that the GQ-6 is the more psychometrically sound scale for 10-13 year olds. If researchers attempt to measure gratitude in 10-13 year olds, they should probably use both the GQ-6 and GAC, looking for convergent findings.

The reason the GRAT-short form performed poorly in the 10-13 year age group relative to the GQ-6 and GAC may be due to the cognitive and experiential limitations of pre-adolescents and the items of this scale. For instance, "Although I think it's important to feel good about your accomplishments, I

think it's also important to remember how others have contributed to my accomplishments," and "Although I'm basically in control of my life, I can't help but think about all those who have supported me along the way," are two items from the GRAT-short form's interpersonal appreciation dimension. Both items refer to one's ability to consider both internal as well as external attributions for outcomes in one's life. This may be particularly difficult for pre-adolescents either because of a newly emerging motivation to establish independence and autonomy (Bronson & Merryman, 2009) or because they may still be developing their industriousness (Erickson, 1968). These pre-adolescents might therefore have difficulty processing judgments that simultaneously consider the causal roles of their personal responsibility and of others in bringing about outcomes in their lives. Further, considering the large individual differences in timing of moving from one cognitive developmental stage to the next (Berk, 2007), it is possible that some of the children in the 10-13 year range had not yet developed formal operations (which occurs around ages 11 and 12) and thus were unable to think abstractly in responding to the GRAT, which tends to have more items about reflecting on one's life experiences or on cerebral phenomena (e.g., appreciating leaves changing color) than the other scales. Thus, these foci in addition to a potentially weaker interpersonal focus relative to the GQ-6 and GAC may be why participants responded differently when compared to these other scales.

It should be noted that the inconsistent findings for 10-13 year olds may be due to developmental differences. That is, with gratitude likely emerging between 7 and 10 years old (Emmons & Shelton, 2002), it is possible that gratitude has developed but not stabilized in children of this age group. Thus, our fourth recommendation is that more research is needed to examine how to measure gratitude for 10-13 year olds. Although our data suggest some tentative evidence for the validity of the GQ-6 scores with youth in this age group, we are limited in the generalizability of our conclusion due to our limited sampling of criterion variables from the possible universe of variables in our nomological network analysis. Therefore, aside from conducting more research on 10-13 year olds with the GQ-6 and including a wider array of variables (e.g., narcissism, prosocial behavior, empathy), another approach would be to create a gratitude scale specifically for this age group. Upon designing a psychometrically strong scale for 10-13 year olds, researchers could then reliably examine individual and environmental determinants in the development of gratitude, attending in particular to the emergence of the requisite social cognitive

appraisal skills (Froh et al., 2010) and the co-development of other processes that also support thriving (Emmons, 2007). This would allow psychologists to distinguish the benefits of gratitude for human development and provide a basis for deriving a developmental theory of gratitude.

It is imperative that researchers build a solid—and reliable—empirical foundation to generate future studies. This pursuit will be compromised if the gratitude scales used inappropriately influence the outcomes. For example, one study found that gratitude was unrelated with NA in 11-13 year olds (Froh et al., 2009b). But these researchers used the GAC to measure gratitude. Had they used the GQ-6, they may have found a negative correlation between gratitude and NA. Thus, some of the previous studies on gratitude in youth, if more appropriate measures were used, might have come to a different conclusion.

Although the current study provides some support for using some adult gratitude scales with youth ages 10-19 years old, important issues should be considered when attempting to measure gratitude in children below 10 years old. First, while research suggests that gratitude is developed by age 10 (Graham, 1988), some scholars believe that it *emerges* gradually between 7 and 10 years old (Emmons & Shelton, 2002). If this is true, how can one measure a disposition that has a large window of development? Empirically, researchers investigating phenomena that are slow to develop tend to examine precursors to these phenomena (Berk, 2007). Thus, researchers interested in assessing gratitude in children below age 10 might consider investigating behaviors that promote the appreciation of benefit exchanges, which would likely be precursors to the emerging disposition of gratitude (e.g., empathy, prosocial behavior, and involvement in mutually beneficial relationships). Second, assuming gratitude has developed enough to be measured via self-report, one must consider the reading comprehension of the child and the reading level of the scale. For instance, the reading level for the GRAT-short form is 4th grade, when children are about 9 years old. Thus, any results, or lack thereof, using the GRAT-short form with the average 7 or 8 year old could be confounded by the child's reading comprehension. One way to correct this problem is to use parent-reports. Parent reports, moreover, may also be used to measure yet other precursors in the development of gratitude (e.g., guiding children's attention to benefit appraisals and modeling gratitude). Indeed, some researchers who have used parent reports purport being able to measure strengths in children even before children themselves can provide self-report of these strengths (Park & Peterson, 2006). Together, these concerns suggest that gratitude

researchers will likely have to take different approaches when measuring gratitude in children both younger and older than age 10.

One noteworthy limitation is that these data are from one affluent school district. Thus, the generalizability of our findings is limited. Future researchers should attempt to replicate our findings in more diverse samples. A second limitation is that we grouped together 10 and 11 year olds, 12 and 13 year olds, and 17 to 19 year olds to ensure a sufficient sample size for the multiple-group CFAs. It would have been ideal to have at least 200 youth for each age. This would have allowed us to examine more precisely the factor structure of the GQ-6, the GAC, and GRAT-short form across each year of age. Future research with larger sample sizes can accomplish this. Finally, when deciding what age range to study, we employed the conservative strategy of making our lower limit 10 year old students. For this first study, we selected students who we could confidently assume had already developed gratitude and could read and understand the items in the questionnaires. To draw definitive conclusions about the GQ-6, GAC, and GRAT-short form across the entire span of gratitude's development in youth, future researchers might consider administering these scales—or perhaps more linguistically simplified versions of these scales or even interviews based on them—to children below age 10 because gratitude may emerge before this age (Emmons & Shelton, 2002). But if they do, they might want to use mixed methods (e.g., interviews, observations) along with empirical data to help provide insight into the development of age sensitive measures in the area of gratitude.

Emphasizing gratitude and building up positive anticipations should help youth sharpen goals and plans that directly augment their welfare and help coordinate efforts to meaningfully engage and educate them across the home, school, and community environments (Damon, 2008). If a comprehensive mission for schools is to turn youth into psychologically well, knowledgeable, responsible, socially skilled, physically healthy, caring and contributing citizens (Greenberg et al., 2003), then fostering gratitude in youth may be an essential aim. Pursuit of this ambitious mission, however, requires that researchers and school professionals first be confident in their assessments of gratitude in children and adolescents. This study provides initial support for the use of extant gratitude measures, with some exceptions, for research purposes.

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Author Notes

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Table 1

*Model Fit and Standardized Factor Loadings for the Three Gratitude Measures across Six Age Groups**When Analyzed Separately*

Gratitude Scales	17-19 yrs	16 yrs	15 yrs	14 yrs	12-13 yrs	10-11 yrs
GQ – 6						
$X^2(df=5)$	44.85	15.44	27.18	15.15	18.04	11.27
NNFI	0.85	0.97	0.92	0.96	0.95	0.98
CFI	0.92	0.98	0.96	0.98	0.97	0.99
IFI	0.93	0.99	0.96	0.98	0.97	0.99
SRMR	0.07	0.03	0.05	0.03	0.04	0.03
Factor Loadings						
Item1	0.87	0.73	0.84	0.82	0.85	0.83
Item2	0.84	0.91	0.89	0.79	0.89	0.77
Item3	0.45	0.58	0.60	0.70	0.31	0.53
Item4	0.55	0.72	0.63	0.71	0.65	0.66
Item5	0.53	0.62	0.52	0.65	0.69	0.64
GAC						
$X^2(df=0)$	0.00	0.00	0.00	0.00	0.00	0.00
NNFI	1.00	1.00	1.00	1.00	1.00	1.00
CFI	1.00	1.00	1.00	1.00	1.00	1.00
IFI	1.00	1.00	1.00	1.00	1.00	1.00
SRMR	0.00	0.00	0.00	0.00	0.00	0.00
Factor Loadings						
Item1	0.77	0.82	0.76	0.67	0.85	0.80
Item2	0.86	0.92	0.89	0.89	0.94	0.92
Item3	0.84	0.79	0.84	0.78	0.84	0.84
GRAT-short form						
$X^2(df=87)$	258.83	240.55	291.63	228.91	281.96	155.63
NNFI	0.91	0.90	0.87	0.91	0.88	0.95
CFI	0.93	0.91	0.89	0.93	0.90	0.96
IFI	0.93	0.91	0.89	0.93	0.90	0.96
SRMR	0.06	0.07	0.08	0.07	0.08	0.06
Factor Loadings						
LOSD-Item1	0.66	0.57	0.61	0.57	0.64	0.66
LOSD-Item2	0.75	0.65	0.66	0.63	0.70	0.77
LOSD-Item3	0.69	0.68	0.69	0.71	0.71	0.72
LOSD-Item4	0.72	0.68	0.74	0.74	0.78	0.77
LOSD-Item5	0.69	0.72	0.68	0.55	0.75	0.72
SA-Item1	0.40	0.48	0.54	0.63	0.48	0.49
SA-Item2	0.42	0.53	0.40	0.49	0.55	0.48
SA-Item3	0.52	0.60	0.62	0.52	0.58	0.61
SA-Item4	0.63	0.65	0.53	0.60	0.59	0.59
SA-Item5	0.74	0.66	0.63	0.68	0.70	0.68
SA-Item6	0.55	0.52	0.57	0.52	0.62	0.62
AO-Item1	0.48	0.36	0.50	0.57	0.58	0.39
AO-Item2	0.55	0.69	0.57	0.69	0.66	0.65
AO-Item3	0.69	0.74	0.71	0.74	0.73	0.77
AO-Item4	0.88	0.74	0.71	0.72	0.46	0.39

Note. GQ – 6 = Gratitude Questionnaire – 6. GAC = Gratitude Adjective Checklist. GRAT = Gratitude, Resentment, Appreciation Test-short form. LOSD = lack of a sense of deprivation. SA = simple appreciation. AO = appreciation for others. LOSD, SA, and AO are three subscales of the GRAT-short form. df = degree of freedom. NNFI = Non-Normed Fit Index. CFI = Comparative Fit Index. IFI = Incremental Fit Index. SRMR = Standardized Root Mean Square Residual. See Appendix B for the actual items for the GQ-6, GAC, and GRAT-short form.

Table 2

Fit Indices for Multiple-group CFA Models across Six Age Groups for the Three Gratitude Scales

Measures and model	χ^2	df	NNFI	CFI	IFI	SRMR
GQ-6						
Congeneric model	131.26	30	.94	.97	.97	.05
Tau-equivalent model	175.46	50	.95	.96	.96	.07
Partial tau-equivalent model ^a	153.67	35	.94	.96	.96	.07
Parallel model	417.39	80	.93	.90	.90	.14
GAC						
Congeneric model	0	0	1.00	1.00	1.00	.00
Tau-equivalent model	13.30	10	1.00	1.00	1.00	.04
Parallel model	162.45	30	.95	.92	.92	.17
GRAT-short form						
Congeneric model	1457.74	522	.90	.92	.92	.07
Tau-equivalent model	1520.10	582	.91	.92	.92	.08
Partial tau-equivalent model ^b	1459.85	527	.90	.92	.92	.07
Partial tau-equivalent model ^c	1468.08	527	.90	.92	.92	.07
Parallel model	2210.26	687	.88	.87	.86	.13

Note. Congeneric model imposes the same number of factors and the same factor loading pattern across groups. Tau-equivalent model additionally imposes equivalent factor loadings across groups above and beyond congeneric model. Parallel model additionally imposes equivalent factor covariances and measurement errors across groups above and beyond tau-equivalent model. df = degrees of freedom. GQ-6 = Gratitude Questionnaire-6. GRAT = Gratitude, Resentment, and Appreciation Test-short form. GAC = Gratitude Adjective Checklist.

^a Partial equivalent model in which only item 3's of the GQ-6 were constrained to have equal factor loadings across age groups.

^b Partial equivalent model in which only item 5's of the LOSD (lack of a sense of deprivation) dimension of the GRAT-short form were constrained to have equal factor loadings across age groups.

^c Partial equivalent model in which only item 4's of the AO (appreciation for others) dimension of the GRAT-short form were constrained to have equal factor loadings across age groups.

Table 3

Descriptive Statistics and Internal Consistencies for the GQ-6, GAC, and GRAT-short form Across Six Age Groups

	Age								
	17-19 (<i>n</i> = 274)			16 (<i>n</i> = 260)			15 (<i>n</i> = 249)		
	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT
Alpha	.78	.86	.83	.84	.88	.80	.81	.87	.82
Mean	28.39	10.94	100.92	28.08	10.95	100.68	29.24	11.55	100.97
<i>SD</i>	4.75	2.87	17.55	5.11	2.89	16.35	4.68	2.82	17.11
Potential Range	5-35	3-15	16-144	5-35	3-15	16-144	5-35	3-15	16-144
Actual Range	5-35	3-15	49-141	12-35	3-15	46-138	13-35	4-15	57-144

(continued)

	Age								
	14 (<i>n</i> = 207)			12-13 (<i>n</i> = 194)			10-11 (<i>n</i> = 217)		
	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT
Alpha	.85	.82	.83	.76	.90	.73	.81	.88	.72
Mean	29.63	11.45	101.78	29.58	12.59	88.06	30.44	13.02	89.76
<i>SD</i>	4.32	2.62	17.76	4.40	2.30	15.86	4.37	2.18	15.16
Potential Range	5-35	3-15	16-144	5-35	3-15	16-144	5-35	3-15	16-144
Actual Range	15-35	4-15	48-138	16-35	6-15	48-140	16-35	6-15	45-136

Note. Students ages 10-11, 12-13, and 17-19 were grouped into one category given the small number of students who reported being 10, 13, 18, or 19 years old. GQ-6 = Gratitude Questionnaire-6; GAC = Gratitude Adjective Checklist; GRAT = Gratitude, Resentment, and Appreciation Test-short form.

Table 4

Zero-Order Correlations Among the GQ-6, GAC, GRAT-Short Form, and Social-Emotional Well-Being Across Six Age

Groups

Measure	Age								
	17-19 (<i>n</i> = 274)			16 (<i>n</i> = 260)			15 (<i>n</i> = 249)		
	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT
GQ-6	-			-			-		
GAC	.42***	-		.52***	-		.47***	-	
GRAT-short form	.60***	.39***	-	.70***	.48***	-	.63***	.43***	-
Positive Affect	.31***	.56***	.36***	.37***	.46***	.30***	.39***	.55***	.41***
Negative Affect	-.16**	-.10	-.24***	-.21***	-.16*	-.17**	-.21***	-.07	-.25***
BMSLSS	.44***	.36***	.42***	.46***	.39***	.43***	.47***	.32***	.46***
CES-DC	-.34***	-.29***	-.34***	-.24***	-.15*	-.21***	-.27***	-.24***	-.33***

(continued)

Measure	Age								
	14 (<i>n</i> = 207)			12-13 (<i>n</i> = 194)			10-11 (<i>n</i> = 217)		
	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT	GQ-6	GAC	GRAT
GQ-6	-			-			-		
GAC	.57***	-		.47**	-		.61***	-	
GRAT-short form	.64***	.42***	-	.22***	.30**	-	.35***	.20**	-
Positive Affect	.44***	.54***	.33***	.28**	.45***	.19*	.34***	.40***	.04
Negative Affect	-.35***	-.13	-.32***	-.23**	-.12	.03	-.09	-.29***	.00
BMSLSS	.59***	.39***	.45***	.58***	.40***	.16*	.56***	.56***	.11
CES-DC	-.44***	-.31***	-.43***	-.31**	-.12	.12	-.30***	-.41***	.21**

Note. Students ages 10-11, 12-13, and 17-19 were grouped into one category given the small number of students who reported being 10, 13, 18, or 19 years old. GQ-6 = Gratitude Questionnaire-6; GAC = Gratitude Adjective Checklist; GRAT = Gratitude, Resentment, and Appreciation Test-short form; BMSLSS = Brief Multidimensional Students' Life Satisfaction Scale; CES-DC = Center for Epidemiologic Studies Depression Scale for Children.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix A

Factor Loadings for GQ – 6 Items in Three Adult samples and Our Youth Sample

Data Source	Wood et al. (2009) U.K. undergraduates N = 201	Lisa Wajsblat U.S. undergraduates N = 282	Our own U.S. undergraduates N = 232	Our own U.S. youth N = 1405
Factor Loadings				
GQ – 6 Item 1	0.83	0.73	0.81	0.82
GQ – 6 Item 2	0.85	0.77	0.86	0.86
GQ – 6 Item 3	0.64	0.65	0.69	0.52
GQ – 6 Item 4	0.66	0.67	0.55	0.67
GQ – 6 Item 5	0.62	0.62	0.62	0.61
GQ – 6 Item 6	0.44	0.33	0.38	0.21

Note. GQ-6 = Gratitude Questionnaire-6. We thank Alex Wood and Lisa Wajsblat for sharing their data with us.

Appendix B

Items from the GQ-6, GAC, and GRAT-short form

Gratitude Scales	Items
GQ – 6	
Item1	I have so much in life to be thankful for.
Item2	If I had to list everything that I felt thankful for, it would be a very long list.
Item3*	When I look at the world, I don't see much to be thankful for.
Item4	I am thankful to a wide variety of people.
Item5	As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.
GAC	
Item1	Grateful
Item2	Thankful
Item3	Appreciative
GRAT-short form	
LOSD-Item1*	There never seems to be enough to go around and I never seem to get my share.
LOSD-Item2*	I really don't think that I've gotten all the good things that I deserve in life.
LOSD-Item3*	More bad things have happened to me in my life than I deserve.
LOSD-Item4*	Because of what I've gone through in my life, I really feel like the world owes me something.
LOSD-Item5*	For some reason I never seem to get the advantages that others get.
SA-Item1	Oftentimes I have been overwhelmed at the beauty of nature.
SA-Item2	Every Fall I really enjoy watching the leaves change colors.
SA-Item3	I think that it's important to "Stop and smell the roses."
SA-Item4	I think that it's important to pause often to "count my blessings."
SA-Item5	I think it's important to enjoy the simple things in life.
SA-Item6	I think it's important to appreciate each day that you are alive.
AO-Item1	I couldn't have gotten where I am today without the help of many people.
AO-Item2	Although I think it's important to feel good about your accomplishments, I think that it's also important to remember how others have contributed to my accomplishments.
AO-Item3	Although I'm basically in control of my life, I can't help but think about all those who have supported me and helped me along the way.
AO-Item4	I feel deeply appreciative for the things others have done for me in my life.

Note. GQ – 6 = Gratitude Questionnaire – 6. GAC = Gratitude Adjective Checklist. GRAT = Gratitude, Resentment, Appreciation Test-short form. LOSD = lack of a sense of deprivation. SA = simple appreciation. AO = appreciation for others. LOSD, SA, and AO are three subscales of the GRAT-short form. * = reverse scored.