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Abstract

Research on the average reliability and factors that affect the reliability of loneliness scales has been restricted to unidimensional measures. A reliability generalization (RG) study was conducted for a multidimensional loneliness measure, that is, the Loneliness and Aloneness Scale for Children and Adolescents (LACA). Multilevel meta-analyses were performed on 79 studies that comprised 92 samples (for a total of 41,076 participants). Average reliability (Cronbach's alpha) across samples was good (i.e., .80 or above) for all four subscales. Studies with higher sampling quality yielded slightly higher alphas for one of the subscales (i.e., Parent-related loneliness). For adolescents, as compared to children, alphas were somewhat lower for three of the four subscales and higher for the Affinity for aloneness subscale. Suggestions for future research are outlined. From a reliability perspective, the LACA is a good option for researchers who want to use a multidimensional loneliness measure with children and adolescents.

Keywords: loneliness, reliability generalization, multidimensional measure, children and adolescents

A Reliability Generalization Study for a Multidimensional Loneliness Scale: The Loneliness and Aloneness Scale for Children and Adolescents

The reliability of an instrument's test scores is important for both academics and practitioners. For academics, low reliability scores may seriously affect the ability of a study to detect statistical significance (Thompson, 2003). In each individual study, therefore, academics have to judge the impact of the reliability of the instrument's scores on the findings obtained. Practitioners, for their part, may need to interpret an individual's test score, using the confidence interval around that score. To obtain these intervals, the standard error of measurement (SE_m) is needed, which is computed using the reliability coefficient. In all these applications, by academics and practitioners alike, the reliability estimates of a large norm group are often used. Reliability, however, is not a characteristic of an instrument and may vary across studies that administered the test with a certain protocol to certain participants on certain occasions (Thompson, 1992). The present study will shed light on the reliability of loneliness scores obtained with the Loneliness and Aloneness Scale for Children and Adolescents (LACA; Marcoen, Goossens, & Caes, 1987) administered in a diverse set of contexts, enabling us to examine whether there are certain contexts in which the LACA functions less adequately.

Reliability Generalization

To gain some insight in the expected degree of reliability of test scores for a given instrument, a Reliability Generalization (RG; Vacha-Haase, 1998) study can be conducted. The RG methodology enables researchers to examine the range of reliability scores that have appeared in the literature, but also to compute an estimated mean reliability across these studies. Furthermore, RG can help explain variation in reliability estimates by examining how the reliability scores are related to characteristics of the instrument itself, the sample under

investigation, or the context in which the study took place (Bonett, 2010). Examples of such explanatory factors include the number of test items, but also participants' age and gender (Vacha-Haase & Thompson, 2011). The explanatory factors, or moderators, examined in this study included eight substantive characteristics (i.e., language, percentage male, age group, study focus, original vs. non-original format of the instrument, publication status, sampling quality, and study design) and two statistical characteristics (i.e., sample mean and variance).

Demonstrating a high mean reliability score with low variability across contexts considerably increases our confidence in the legitimate use of that particular instrument. In the present study, we concentrated on a particular type of reliability estimate, Cronbach's alpha (Cronbach, 1951), for measures of loneliness in a specific age range, that is, childhood and adolescence. More specifically, we applied the RG methodology to a multidimensional loneliness measure, that is, the LACA (Marcoen et al., 1987).

Loneliness: Conceptualization and Measurement

Loneliness is a universal phenomenon resulting from a perceived discrepancy between the actual and desired levels of both the quantity and quality of one's relationships (Perlman & Peplau, 1981). Feelings of loneliness have a negative effect on children's and adolescents' mental and physical well-being (Heinrich & Gullone, 2006). To measure this important construct, two different conceptualizations have been developed (Russell, 1982).

Researchers advocating a *unidimensional* conceptualization view loneliness as a unitary concept that may vary in intensity and they frequently use the revised version of the loneliness scale developed at the University of California at Los Angeles (UCLA-R; Russell, Peplau, & Cutrona, 1980). Researchers adhering to a *multidimensional* conceptualization aim to differentiate among various hypothesized manifestations of loneliness. Loneliness experiences, for example, likely take on a different form in different relationships, such as in relationships with peers or parents. Three multidimensional loneliness measures are available

that focus on relation-specific types of loneliness. The Differential Loneliness Scale (DLS; Schmidt & Sermat, 1983), designed for use with college students and adults, distinguishes among romantic-sexual relationships, friendships, relationships with family, and relationships with larger groups or communities. The Social and Emotional Loneliness Scale for Adults (SELSA; DiTommaso & Spinner, 1993), again primarily designed for use with college students and adults, distinguishes among romantic relationships, friendships, and relationships with family. Finally, the LACA (Marcoen et al., 1987), designed for use with children and adolescents, distinguishes between relationships with peers and with parents.

Considerable variability in internal consistency has been found for both unidimensional and multidimensional measures of loneliness. The only RG study to date on a loneliness measure found alphas to range from .53 to .95 for the unidimensional UCLA-R (Vassar & Crosby, 2008). Inspection of the literature reveals that for the peer-related loneliness subscale of the LACA, for example, a Cronbach's alpha of .87 was found in the original publication (Marcoen et al., 1987) and an estimate as low as .66 in later work (Qualter, Brown, Munn, & Rotenberg, 2010).

The present study concentrated on the LACA, as it was the only multidimensional measure for which an RG study could be conducted across our self-selected age range of childhood and adolescence. Neither the DLS nor the SELSA were designed for use with children.

The Loneliness and Aloneness Scale for Children and Adolescents

The LACA is a 48-item scale intended for use in the age range of 10 to 19 years (Marcoen et al., 1987). The instrument measures two relation-specific types of loneliness, that is, parent-related loneliness (L-Part, e.g., "I feel left out by my parents") and peer-related loneliness (L-Peers, e.g., "I feel sad because I have no friends"). An additional strength of the LACA is that it also assesses a person's attitude towards aloneness. Two clusters of reactions

towards social isolation have been identified, that is, aversion to being alone (A-Neg, e.g., “When I am alone, I feel bad”) and affinity for being alone (A-Pos, e.g., “I want to be alone”). Previous research has included these attitudes towards aloneness to place feelings of loneliness in a somewhat broader perspective (e.g., Larson, 1997; Marcoen & Goossens, 1993). For example, when someone scores relatively high on aversion to aloneness, he or she may more easily feel lonely when being alone. Each of these four subscales consists of 12 items, that can be answered on a 4-point scale ranging from often to never. In the LACA manual (Goossens, 2013), Cronbach’s alphas in the norm group ($N = 9,676$; aggregated across 30 samples) were .89 (L-Part), .88 (L-Peers), .79 (A-Neg), and .83 (A-Pos).

The present study aimed to examine the reliability of scores obtained by the LACA administered in a diverse set of contexts. First, we estimated the mean reliability scores of the four LACA subscales based on all studies that have included the LACA. Second, we examined the role of sample and study characteristics as moderators of the internal consistency of the instrument.

Method

Literature Search

The literature search was performed using five databases, that is, PsychINFO, ERIC, PubMed, ProQuest Dissertations, and the local university search engine. Search strings that were used included “*loneliness and aloneness scale for children and adolescen**” and “*(LLCA OR LACA OR LEKA) AND (lonel* OR perceived social isol*)*”. This literature search resulted in 81 hits. Of those 81 hits, 28 were identified as duplicates and 20 were excluded as irrelevant based on the abstract, resulting in 33 relevant studies. To avoid publication bias, we further checked the reference lists of the studies obtained, contacted experts in the field, and examined the manual of the LACA (Goossens, 2013). This yielded an additional 114 studies, mainly unpublished master’s theses, resulting in a total of 147 studies.

Inclusion and Exclusion Criteria

Studies were included if they (a) used the LACA, (b) focused on children and/or adolescents, (c) were written in a language that the authors of this study could understand (i.e., Dutch, English, French, German, Italian, Portuguese, or Spanish), and (d) reported Cronbach's alpha as computed on the study's sample. Despite initial indications, it turned out that four studies did not use the LACA. These four studies, together with a study that could not be retrieved, were excluded from the database. Six studies were deleted, because they focused on university students. Furthermore, in 11 studies, Cronbach's alpha was not reported or computed. Authors of journal articles were asked to provide Cronbach's alpha for the LACA subscales and all but one effectively did so. Finally, to ensure that the reliability estimates were derived from independent samples, we scrutinized studies conducted by the same author(s). Based on this review, 51 studies were identified as duplicates and were excluded.

Data Set

Our final data set consisted of 79 studies from 1987 to 2014, reporting Cronbach's alphas for 92 samples (k). In all, 321 Cronbach's alphas (N_α) were collected for the four subscales L-Part ($n_\alpha = 77$), L-Peers ($n_\alpha = 88$), A-Neg ($n_\alpha = 78$), and A-Pos ($n_\alpha = 78$). The final data set consisted of 23 journal articles, 4 book chapters, 46 master's theses, 1 dissertation, 3 conference papers and internal reports, and 2 data files. For the large majority of samples, a cross-sectional design was used ($k = 82$), and in a few cases an experimental ($k = 1$) or a longitudinal ($k = 9$) design. Originally, the LACA was developed in Belgium and written in Dutch, which is reflected in the current data set with 65 samples from Belgium and 5 from the Netherlands (the neighboring country where Dutch is the official language). Meanwhile, the LACA has been adapted and translated in numerous languages (i.e., Arabic, Chinese, English, Greek, Hebrew, Italian, Spanish, and Portuguese), resulting in samples from 11 countries.

Sample sizes varied from 106 to 5,862 participants. In all, 41,076 children and adolescents were included in the present meta-analyses, 48% of which were male. Samples included children, that is, elementary school students ($k = 35$) and adolescents, that is, secondary school students ($k = 57$). Furthermore, samples were categorized as nonclinical ($k = 90$) or mixed (i.e., comprising both clinical and nonclinical participants; $k = 2$). Clinical syndromes comprised autism spectrum, motor and/or sensory disabilities, and learning disabilities with or without attention deficit hyperactivity disorder. Most studies did not report participants' ethnicity or SES. The few studies that did provide some information included a vast majority of Caucasian middle class participants.

Coding of Studies

Based on earlier RG work on the UCLA-R (Vassar & Crosby, 2008), we selected five substantive characteristics, that is, language, percentage male, age group, study focus, and original vs. non-original format of the instrument. We further added three substantive characteristics that were not coded in that earlier work, but proved relevant for the present study. These characteristics were publication status, sampling quality, and design. Papers that were coded as having low sampling quality were papers that included samples from one school in one city in one area. In all other cases (i.e., when samples came from several areas, cities, or schools), this was coded as 'other'. The coding of the eight substantive characteristics can be found in Table 1. Finally, as recommended by Rodriguez and Maeda (2006), we added two statistical moderators, that is, sample mean and variance (both coded as a continuous variable).

In most RG studies, no a priori hypotheses are phrased, as the primary intent of these studies is merely to check whether any of the characteristics selected have an impact on Cronbach's alpha. In their primary analysis, based on those samples for which the sample standard deviation was available, Vassar and Crosby (2008) found that samples with a higher

standard deviation had a slightly higher alpha for the UCLA-R and that substantive articles yielded slightly higher alphas than did measurement articles. The first finding was in line with classical test theory, which states that, all other things being equal, samples with greater variances can be expected to have higher alphas. The second finding defied clear interpretation. In subsequent analyses, based on all samples, alpha was also slightly lower in adolescents (as compared to all other age groups) and in samples in which participants were separated from their social network (i.e., immigrants, elderly, and college students). The latter characteristic could not be coded in the present study, as most samples of participants effectively were well-connected to their social network.

Statistical Analyses

Accounting for dependency. In the present study, a multilevel RG study was conducted, as several studies included more than one sample and reported on more than one reliability estimate. A multilevel meta-analysis does not make the strong assumption of independence that underlies traditional meta-analytic approaches, but explicitly accounts for a possible dependence (Hox, 2002; Van den Noortgate & Onghena, 2003). Ignoring the dependence may lead to misleading results, while avoiding dependence (e.g., by selecting just a single estimate) may result in a loss of information (Van den Noortgate, López-López, Marín-Martínez, & Sánchez-Meca, 2012). In the present multilevel RG study, the dependency among multiple reliability coefficients reported in the same study is modeled by adding an intermediate level: we have used a three-level model, accounting for sampling variance (i.e., Level 1; sampling variation for each observed alpha value), within-study variance (i.e., Level 2; variation of alpha values within a study), and between-study variance (i.e., Level 3; variation of alpha values over studies). Another source of dependency in our study is that participants often completed items of more than one subscale. Therefore, we performed meta-analyses for the four subscales separately. As a sensitivity analysis, we followed another way

to account for this dependency, that is, we analyzed the alphas for all scales together using a robust variance estimation procedure as proposed by Hedges, Tipton, and Johnson (2010).

Publication bias. A common problem in meta-analyses is publication bias. To check for such bias, we inspected a funnel plot for each subscale. In addition to this visual inspection, we wanted to statistically test for publication by using three methods, that is, we calculated and tested Kendall's Tau, performed Egger's intercept test, and examined the moderating effect of publication status. Kendall's Tau is used to evaluate the correlation between a study's sample size and Cronbach's alpha. Unusual findings, for instance, when small samples correspond to higher Cronbach's alphas, may indicate publication bias. Egger's test is a comparable method that uses the actual values of Cronbach's alpha, rather than ranks. As a sensitivity analysis, we used the trim and fill method to correct for potential publication bias (Duval & Tweedie, 2000).

Statistical modeling. As Cronbach's alpha by its nature follows a skewed distribution, whereas the meta-analytic techniques we used assume a normal sampling distribution, we used the Bonett-transformation (Sánchez-Meca, López-López, & López-Pina, 2012). Further, we used the formula given by Sánchez-Meca et al. (2012) to estimate the sampling variance of the Bonett-transformed alphas, which is necessary for obtaining confidence intervals and for the applied weighting method. Based on recommendations of Sánchez-Meca et al. (2012), the reliability coefficients were weighted by the inverse variance. This means that samples with higher precision (i.e., smaller variance, probably because of a larger sample size) get a greater weight in the analyses. In the current study, a mixed-effects meta-analytic model was used (Borenstein, Hedges, Higgins, & Rothstein, 2011) that assumes that the population value of Cronbach's alpha can vary from study to study and that its value may depend on the characteristics of that particular study.

In a first step, intercept-only models (i.e., models without predictors) were examined. In the next steps, predictors were entered in the model and moderator effects were investigated. Initially, all moderators were examined separately. Significant moderators in these analyses were then used to build the final model using both forward and backward stepwise methods. Analyses were conducted with the procedure Mixed from SAS 9.3 using restricted maximum likelihood (REML) as estimation method (Littell, Milliken, Stroup, Wolfinger, & Schabenberger, 2006). Mean and moderating effects were statistically tested by a Wald test, comparing the ratio of the estimate over the corresponding standard error estimate to a *t*-distribution, with degrees of freedom estimated using the Satterthwaite (1946) method. A likelihood ratio test was used for testing the (residual) heterogeneity between samples and between studies, before and after accounting for the moderators (Raudenbush & Bryk, 2002).

Results

Descriptive Statistics

Descriptive statistics of the moderator variables are presented in Table 1. The moderator Publication bias was coded at the study level, whereas the other moderators were coded at the sample level, as reflected by the higher number of observations for these variables. The Variance inflation factors (VIF) did not indicate problems of multicollinearity (O'Brien, 2007). The correlations show that studies that used a translated version of the LACA were also likely to have used a non-original version. Furthermore, sampling quality was higher in samples including children than in samples of adolescents.

The descriptive statistics of the four subscales and their intercorrelations are presented in Table 2. On average, participants scored highest on the subscale aversion to being alone ($M = 2.64$, $SD = 0.14$). Mean variability in scores was roughly equal across the four subscales ranging from 0.46 to 0.53. Considerable variation of Cronbach's alpha was found across

samples, with the largest range for the aversion to aloneness subscale (alpha ranging from .60 to .93). The means of the reported correlations among the subscales were positive and small to medium in size (r_M ranges from .05 to .34), except for the correlation between the two attitude scales. Figure 1 presents the distribution of Cronbach's alphas across samples.

Mean Reliability

The intercepts of the intercept-only models reflect the estimated mean reliability (as displayed in Table 3). Back transformations of these values reveal mean Cronbach's alphas with 95% confidence intervals of .87 [.86, .88] for parent-related loneliness, .87 [.87, .88] for peer-related loneliness, .80 [.78, .80] for aversion to being alone, and .81 [.80, .82] for affinity for being alone. Further, for all subscales, except A-Pos, we found significant within-study variance. This means that there is variation among the obtained Cronbach's alphas, which might be explained by sample characteristics. It is thus legitimate to examine moderators that may explain this variability. For all subscales, except A-Neg, we found significant between-study variance. This means that samples within a study are more alike than samples from different studies. It is necessary to take this dependency into account, as has been done in the multilevel model used.

In addition to the separate analyses for the four subscales, we used the robust variance estimator approach as proposed by Hedges et al. (2010). The results were virtually identical, so in the following, we will describe the results of the separate analyses only.

Moderator Effects

To examine moderating effects, the continuous predictors were centered around the mean with the exception of publication year, which was centered around the first year of publication. We then followed a two-step approach. First, the effect of each predictor was investigated separately. The results of these models including one moderator only are presented in Table 3. In order to save space, intercepts of these models are not presented.

Significant predictors were then used to build the final model (Table 4). Note that the Bonett transformation changes the sign of the effects. A negative regression coefficient thus actually means an *increase* in the estimated Cronbach's alpha with an increase of the predictor value. To facilitate interpretation, we added the back transformed estimates for predicted scores when all predictors are being zero (first line) or when only the predictor from that line is equal to 1. For example, regarding L-Peers, the predicted estimate of Cronbach's alpha for a non-Dutch study including children is .89, for a non-Dutch study including adolescents .89, and for a Dutch study including children .86.

Several predictors, including SD, that proved significant in the individual analyses no longer had a significant effect in the final model, because of the pattern of intercorrelations among the predictors. Results of the final models show that for adolescents, as compared to children, the estimated Cronbach's alpha is slightly lower for L-Part, L-Peers, and A-Neg and slightly higher for A-Pos. Further, studies with a higher sampling quality have slightly higher estimates of Cronbach's alpha for L-Part. Studies that used the LACA in Dutch showed a lower estimate of Cronbach's alpha for L-Peers than studies that used the LACA in another language. Finally, results revealed that a higher mean on the subscale A-Pos was related to higher estimates of Cronbach's alpha for this scale. The final models explained 43% of the total variance for L-Part, 35% for L-Peers, 15% for A-Neg, and 13% for A-Pos.

Robustness of Findings

Based on Quantile-Quantile (QQ) plots, no strong indications of non-normality were encountered. We did find one outlier for the A-Neg subscale, but excluding this study did not substantially change the results (i.e., the estimated mean Cronbach's alpha changed from .802 to .800). We further performed sensitivity analyses by leaving out alphas for each study in turn and running the meta-analysis on the remaining studies. No substantial changes in results were encountered. Finally, we checked for publication bias and did not find any systematic

indications for this phenomenon using multiple methods. First, visual inspection of the funnel plots revealed no problems. Second, results revealed no significant moderator effect of publication status. Third, for Kendall's Tau and Egger's intercept tests, results were mostly not significant. If a significant result was found, this only held for one of these tests. Fourth, the trim and fill method used for correcting possible biases did hardly change the results.

Discussion

The goal of this study was to use reliability generalization (RG) techniques to examine the internal consistency (i.e., Cronbach's alpha) of a multidimensional measure of loneliness, the Loneliness and Aloneness Scale for Children and Adolescents (LACA). The mean alpha of the four subscales was considered good. So there are now several scales, both the unidimensional UCLA-R (Vassar & Crosby, 2008) and the multidimensional LACA, that have reached the commonly accepted reliability benchmark (i.e., $\alpha = .80$ or above), with minimal variability (i.e., SDs around .05), when averaged across a sizeable number of studies using RG techniques.

An additional objective of this study was to examine the role of a set of demographic and other variables that might affect the variability in the reliability estimates obtained, in the exploratory fashion that is typical of RG studies. In the final model, few of the potential moderators selected proved to be significant predictors of this variation in reliability, which should encourage potential users' confidence in the instrument, among academics and practitioners alike.

Just a single one of the effects obtained went in the expected direction according to classical test theory. Results for the parent-related loneliness subscale showed that samples with higher sampling quality, which can be expected to show greater variance, tended to yield slightly higher alphas. In addition, alphas for three of the four LACA subscales were somewhat lower in adolescents as compared to children. The latter finding converges with the

lower reliability in adolescent samples as compared to samples of adults or the elderly for the UCLA-R in the Vassar and Crosby (2008) study. In line with these authors, we suggest that further analyses of the scales' content and their associations with external variables be conducted to further explore the appropriateness of measures of loneliness with this particular age group. The finding that samples with a higher mean score tended to have slightly higher alphas also calls for additional research. Finally, the fact that samples in which the LACA was used in its original language (i.e., Dutch) tended to have lower reliability than samples in which the instrument was used in another language may seem counterintuitive. In most cases, reduced reliability is observed when adapting a measure to another language, as linguistic subtleties tend to get lost in translation. The increased reliability observed in the present sample of studies might be explained by the overlap among the moderators used. Samples that completed a non-Dutch version of the LACA more frequently used another version than the original one. Such versions typically are briefer and include only items with the highest factor loadings in the original version. Retaining items with high factor loadings only will automatically lead to higher Cronbach's alphas.

The present study has a number of strengths, including the large number of unpublished studies included in the analyses. However, it is important to realize that the results of RG work cannot be generalized beyond the kind of samples used in the analyses. Challenges to the generalizability of earlier reliability estimates become more demanding as the instrument under scrutiny is applied with populations and in circumstances that are more radically different from the original conditions of application. Applications with groups that can be expected to have lower alphas, such as particular clinical groups, can be particularly informative here. Yin and Fan (2000), for instance, found lower Cronbach's alpha for a measure of depressive symptoms in samples with substance abuse, presumably because substance abusers all show depressive symptoms to a certain degree. In a similar vein, future

RG work with participants who are temporarily cut off from their social network (e.g., immigrant youth) or in particular types of schools that are characterized by a less supportive school climate or less beneficial conditions overall, can expand substantially on the current empirical effort. Future work also has to determine in RG analyses whether other multidimensional measures of loneliness, such as the DLS and the SELSA, yield adequate reliability estimates with limited variability over studies.

Pending such future work, the present study is a small but important step in the ongoing evaluation of the reliability of measures of loneliness, which has to be expanded upon in meta-analyses that use a larger set of studies. Generally speaking, the results seem to support the use of the multidimensional LACA in children and adolescents sampled from the general population, much like earlier work supported the use of the unidimensional UCLA Loneliness scale with adults from the general population.

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- Note.* References for studies used in the meta-analysis can be found at the following URL:
<https://econtent.hogrefe.com/doi/suppl/10.1027/1015-5759/a000237>

Table 1
Descriptive Statistics of and Correlations Among Moderator Variables

Variable	Coding	<i>N</i>	<i>M</i>	<i>SD</i>	VIF	1	2	3	4	5	6	7
1. Published	0 = no, 1 = yes	78	0.32	0.47	1.89	-						
2. Language scale	0 = non-Dutch, 1 = Dutch	91	0.77	0.42	1.77	-.31**	-					
3. Percentage male	Coded as continuous variable	90	0.48	0.11	1.16	.09	-.12	-				
4. Age group	0 = child, 1 = adolescent	92	0.59	0.50	1.22	.04	-.04	-.10	-			
5. Sampling quality	0 = lowest sampling quality, 1 = other	92	0.76	0.43	1.37	.08	.01	.13	-.11	-		
6. Design	0 = cross-sectional, 1 = other	92	0.11	0.31	1.23	.15	-.14	-.02	-.06	-.05	-	
7. Study focus	0 = psychometric, 1 = substantive	91	0.81	0.39	1.42	-.19	.00	.04	.22*	.21	.08	-
8. Original scale	0 = no, 1 = yes	92	0.86	0.35	1.90	-.44***	.56***	-.09	-.15	.07	.04	-.03

Note. L-Part = parent-related loneliness; L-Peers = peer-related loneliness; A-Neg = aversion to being alone; A-Pos = affinity for being alone.

VIF = Variance Inflation Factor.

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

Table 2
Descriptive Statistics of the Four Subscales

Scale	Mean		SD		Alpha		Correlations		
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>Range</i>	L-Part <i>M (SD)</i>	L-Peers <i>M (SD)</i>	A-Neg <i>M (SD)</i>
L-Part	1.65 (0.27)	0.46 (0.15)	.86 (.05)	.70–.93	–				
L-Peers	1.80 (0.17)	0.53 (0.18)	.87 (.04)	.66–.92	.22 (.10)				
A-Neg	2.64 (0.14)	0.46 (0.14)	.79 (.05)	.60–.93	.05 (.08)	.15 (.11)			
A-Pos	2.58 (0.20)	0.46 (0.14)	.80 (.05)	.67–.90	.13 (.09)	.34 (.07)	-.02 (.17)		

Note. L-Part = parent-related loneliness; L-Peers = peer-related loneliness; A-Neg = aversion to being alone; A-Pos = affinity for being alone. Means and standard deviations are based on the 96 samples.

Table 3

Separate Regression Analyses for the Individual Moderators Predicting the LACA Subscales

Predictor	L-Part		L-Peers		A-Neg		A-Pos	
	<i>B</i>	<i>SE B</i>	<i>B</i>	<i>SE B</i>	<i>B</i>	<i>SE B</i>	<i>B</i>	<i>SE B</i>
Intercept-only model	-2.04***	0.04	-2.07***	0.03	-1.59***	0.03	-1.66***	0.03
Published	-0.03	0.09	-0.17**	0.06	0.01	0.07	-0.05	0.06
Language scale	0.22*	0.10	0.31***	0.06	-0.05	0.07	0.09	0.07
Percentage male	0.51	0.36	0.43	0.25	0.00	0.25	0.33	0.23
Age group	0.43***	0.07	0.13*	0.06	0.16**	0.06	0.16**	0.05
Sampling quality	-0.26**	0.09	-0.02	0.07	-0.08	0.07	-0.08	0.06
Design	-0.15	0.16	-0.01	0.10	0.10	0.13	0.13	0.12
Study focus	-0.08	0.11	-0.07	0.07	-0.04	0.07	0.03	0.07
Original scale	0.18	0.16	0.11	0.09	0.06	0.12	0.04	0.12
Mean	-0.50**	0.20	0.21	0.17	-0.28	0.20	-0.43**	0.13
SD	-1.28***	0.27	0.09	0.19	-0.43	0.22	-0.21	0.22

Note. L-Part = parent-related loneliness; L-Peers = peer-related loneliness; A-Neg = aversion to being alone; A-Pos = affinity for being alone. Intercepts of the individual models are omitted from the table to save space.

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

Table 4

Regression Analysis Summary of the Final Models

Predictor	L-Part			L-Peers			A-Neg			A-Pos		
	<i>B</i>	<i>SE B</i>	$1 - e^B$	<i>B</i>	<i>SE B</i>	$1 - e^B$	<i>B</i>	<i>SE B</i>	$1 - e^B$	<i>B</i>	<i>SE B</i>	$1 - e^B$
Intercept	-2.16***	0.05	.88	-2.20***	0.04	.89	-1.65***	0.04	.81	-1.58***	0.05	.79
Age group	0.42***	0.07	.83	0.15**	0.05	.89	0.16***	0.06	.78	-0.14**	0.06	.82
Sampling quality	-0.22***	0.07	.91									
Language				0.32**	0.06	.86						
Mean										-0.34**	0.13	.85

Note. L-Part = parent-related loneliness; L-Peers = peer-related loneliness; A-Neg = aversion to being alone; A-Pos = affinity for being alone. Column $1 - e^B$ represent the predicted estimates of Cronbach's alphas.

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

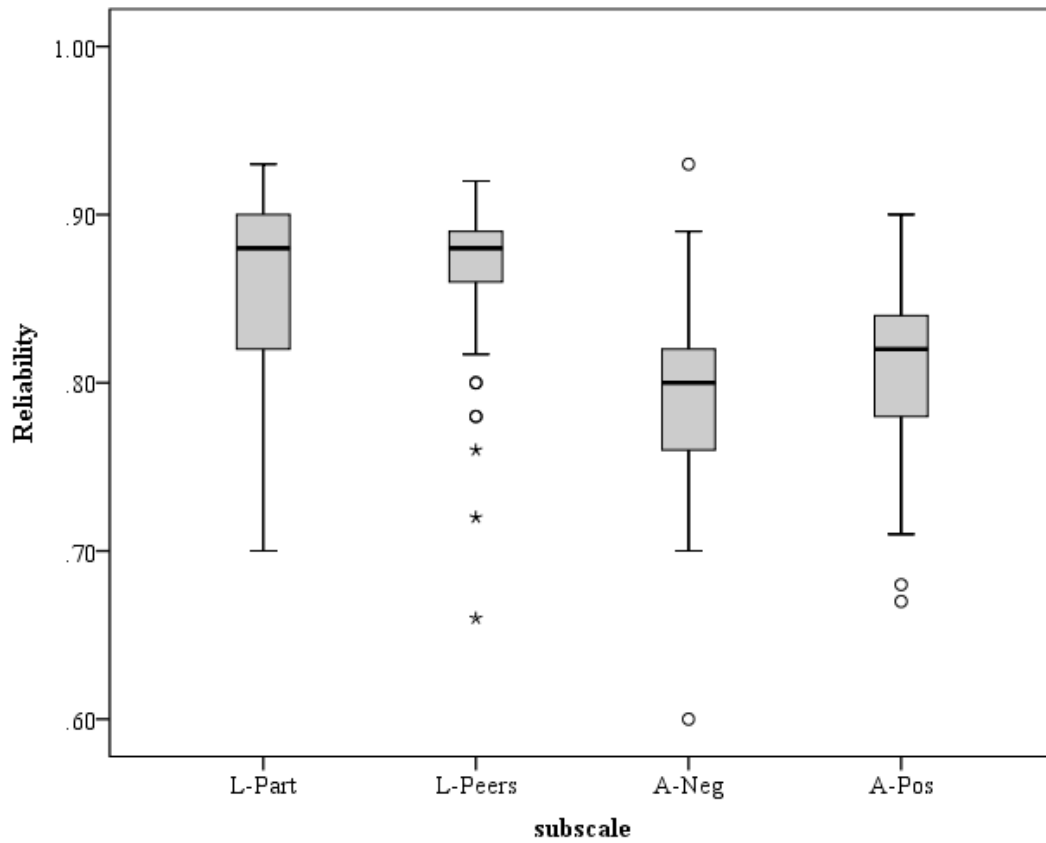


Figure 1. Box-and-whisker plot of the observed coefficient alphas for parent-related loneliness (L-Part), peer-related loneliness (L-Peers), aversion to being alone (A-Neg), and affinity for being alone (A-Pos).