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Loneliness, Depressive Symptomatology, and Suicide Ideation in Adolescence: Cross-Sectional and Longitudinal Analyses

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Abstract The paper presents the first known longitudinal study of the relationship between loneliness, depressive symptoms, and suicide ideation in adolescence, in a stratified sample of high school students (Time 1 *N*= 1009; 57 % female; Time 2 *N*=541; 60 % female). Cross-lagged structural equation modeling indicated that depressive symptoms led to more loneliness across time, whereas loneliness did not predict higher levels of depressive symptoms across time. Loneliness was found to be a correlate of depressive symptoms at the cross-sectional level, independent of gender, other demographic factors, multiple psychosocial variables, and social desirability. Loneliness did not predict suicide ideation over time or at the cross-sectional level, when controlling for depressive symptoms. Gender did not predict loneliness, depressive symptoms or suicide ideation across time. Future longitudinal studies of the relationship between loneliness, depressive symptoms, and suicide ideation in adolescence should use more extensive designs.

Keywords Loneliness · Depression · Suicide ideation · Adolescence · Longitudinal

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Theoretical approaches to loneliness have assigned special importance to adolescence, which continues to be regarded as a period of life when loneliness is particularly prevalent (Heinrich and Gullone 2006). Given that adolescents tend to define themselves in terms of social relationships and are increasingly aware and concerned about acceptance, social value, and self-presentation, being lonely in adolescence may not only include feeling alienated from peers, but also the feeling of having failed a critical task of being socially connected (Larson 1999). Indeed loneliness in adolescence has been associated with poor adjustment (Heinrich and Gullone 2006). However, longitudinal research is scarce. This paper presents the first known longitudinal study of the relationship between loneliness, depressive symptoms, and suicide ideation in adolescence, using data from a sample of high school students.

Loneliness and Depression: Two Related Constructs

The initiation and maintenance of social relationships are important to life satisfaction, and numerous studies have indicated that loneliness is associated with symptoms of poor mental health such as depression (Heinrich and Gullone 2006). Moreover, depression is associated with social withdrawal, negative appraisals, and self-perceived social failure, which may increase the risk of loneliness (Young 1982). Additionally, people tend to respond negatively to depressed people (Sacco and Vaughan 2006). Thus, it was speculated that loneliness and depressive symptoms in adolescence might engage in a reciprocal relationship that has a negative impact on well-being and mental health.

At the cross-sectional level, loneliness has long been recognized as an important correlate of depressive

symptoms. A meta-analysis on 33 adolescent samples indicated that the relationship between depression and loneliness is in the range of a large effect size (r=0.55–0.60; outliers excluded; Mahon et al. 2006). The rather strong correlation between loneliness and depression has raised discussion about the conceptual or functional separation of the two conditions (e.g., Weeks et al. 1980) and loneliness is often seen as a symptom of depression, represented by one or more items in most measures of depression (e.g., Thastum et al. 2009). However, by means of Structural Equation Modeling (SEM) loneliness and depressive symptoms have been found to define two correlated but separated constructs in undergraduates (Weeks et al. 1980). In addition, exploratory factor analysis with samples of undergraduates and middle-aged to older adults has indicated that loneliness and depression are related but distinct constructs (Cacioppo et al. 2006b). In distinguishing between the two constructs, it has been suggested that loneliness solely involves disaffection with interpersonal issues, whereas depression is a more global and heterogeneous condition involving concerns across multiple domains (Heinrich and Gullone 2006). Also, many researchers have pointed to the interactional nature of depression, arguing that interpersonal factors, for instance loneliness, are critically involved in the pathway from vulnerability to manifestations of depressive symptoms (e.g., Hammen 1999; Joiner et al. 1999a). Moreover, it can be speculated that depression-related mechanisms that produce interpersonal problems increase the risk of loneliness. For instance, loneliness could be related to interpersonal skills deficits associated with depression (Segrin and Abramson 1994).

Loneliness as a Specific Correlate of Depression

Previous studies have shown loneliness to be a specific correlate of depressive symptoms in undergraduates (Hagerty and Williams 1999; Jackson and Cochran 1991), middle-aged to older adults (Cacioppo et al. 2006a), older men (Alpass and Neville 2003), and patients with major depressive disorder (Hagerty and Williams 1999). The variables that were controlled in these studies ranged from demographics to social support, social conflict, sense of belonging, hostility, perceived stress, and general distress. As such, the available studies indicate that loneliness is a specific correlate of depression. However, to our knowledge, no studies have investigated if this is the case in adolescence. Moreover, it seems relevant to control for a broad range of variables that commonly have been associated with adolescent loneliness such as anxiety, perceived stress, social support and associated factors like network orientation (Mahon et al. 2006). Also, it is important to consider the lager clinical picture of which these conditions may be a part. Therefore, anxiety, which shares a number of features with loneliness and depression (Koenig and Abrams 1999), is of particular interest as a control variable. Because of the co-morbidity between anxiety and depression and the association between anxiety and loneliness, it may be speculated that the inclusion of anxiety as a covariate could have a substantial impact on the association between loneliness and depression.

Longitudinal Associations between Loneliness and Depression

Longitudinal studies have found loneliness to correlate with depressive symptoms across time in children (Rotenberg et al. 2004), adolescents (Koenig and Abrams 1999; Rotenberg et al. 2004), undergraduates (Bonner and Rich 1991; Joiner 1997), and elderly people (Heikkinen and Kauppinen 2004). In addition, three of these studies found depressive symptoms to correlate with later loneliness (Joiner 1997; Rotenberg et al. 2004, Studies 1 and 2). The measurement interval varied substantially in these longitudinal studies, ranging from 5 weeks to 10 years. However, none of the above mentioned studies controlled for cross-sectional relations between loneliness and depressive symptoms at the investigated time points. Only one of these studies controlled for initial symptoms, showing that loneliness remained a correlate of depressive symptoms across time when adjusting for initial depressive symptoms (Koenig and Abrams 1999). In contrast, one study with undergraduates found no evidence of any relationship between loneliness and depressive symptoms over time independent of cross-sectional relations at two time points (Weeks et al. 1980). Unfortunately, this study measured loneliness and depression only 5 weeks apart, which may explain the result observed.

Evaluating the available body of research, earlier studies do not offer a complete longitudinal investigation of the potential reciprocal relationship between loneliness and depression, that is, they do not investigate the relationship between loneliness and depression across time independent of the cross-sectional relations and time effects over a reasonable time period. The only exception is a population-based study of middle-aged and older adults (Cacioppo et al. 2006a), which investigated the relationship between loneliness and depressive symptoms independent of demographics and other psychosocial variables over a 3-year period using latent variable growth models. This study revealed a reciprocal influence over time, indicating that loneliness and depressive symptoms act in a synergistic way to diminish well-being in this age

group. No studies, however, have thoroughly investigated the longitudinal relationship between loneliness and depression in adolescence.

Loneliness, Depression, and Suicide Ideation

Several studies have shown that suicide ideation or behavior is associated with higher levels of both depressive symptoms and loneliness in adolescents (Garnefski et al. 1992; Roberts et al. 1998), undergraduates (Rich and Bonner 1987; Weber et al. 1997), and elderly people (Lebret et al. 2006). Moreover, depression has been found to be a specific correlate of suicide behavior in many studies (e.g., Roberts et al. 1998) and depression appears to be the most frequently reported factor associated with adolescent suicide (Pagliaro 1995).

Moreover, many researchers have investigated interpersonal variables such as loneliness as risk factors of adolescent suicidality (King and Merchant 2008).The interpersonal-psychological theory of suicide hypothesizes that three components must exist for an individual to die by suicide: (1) the acquired capability to enact lethal self-injury, (2) the sense that one is a burden, and (3) thwarted belongingness (i.e., the sense that one does not belong to or feel connected with a valued group or relationship; Joiner 2005). The conceptual or functional separation of the loneliness and thwarted belongingness concepts is not clear from the available literature. However, a considerable number of studies has considered aspects of thwarted belongingness and loneliness together and a sense of belongingness has been speculated to be a buffer against loneliness (Mellor et al. 2008).

Yet, it is poorly understood whether loneliness is a specific correlate of suicide ideation and studies that have explored this using multiple regression analyses have yielded mixed findings. Loneliness has been found to be a predictor of suicide ideation in early adolescence adjusting for depression, life time suicide attempts, demographics, and various measures of mental health (Roberts et al. 1998). Likewise loneliness in undergraduates has been reported to be a predictor of suicide ideation independent of depression, reasons for living, and negative life events (Rich and Bonner 1987). In contrast, loneliness was not found to predict suicide ideation in a study of adolescents, when controlling for depression, hopelessness, substance abuse, and few reasons for living (Rich et al. 1992). Moreover, loneliness was not associated with suicide attempts when adjusting for depression and other risk factors in a study of hospitalized adolescents (Grøholt et al. 2000). These mixed findings call for further research. Moreover, the majority of studies are cross-sectional and the relationship between loneliness and suicide ideation across time is poorly understood. As such, it is relevant to investigate the relationship between loneliness, depression, and suicide ideation in adolescence further.

The Present Study

The present study was designed to overcome the limitations of previous research by investigating the relationship between loneliness, depressive symptoms, and suicide ideation in adolescence, using a sample of Danish high school students. By means of cross-sectional data and a longitudinal design with two waves (1 year apart), we tested the hypotheses that:

(a) Loneliness is a correlate of depressive symptoms, independent of demographics, multiple psychosocial variables, and social desirability.
(b) Loneliness predicts depressive symptoms across time, independent of initial depressive symptoms, later loneliness, and demographics.
(c) Depressive symptoms predict loneliness across time, independent of initial loneliness, later depressive symptoms, and demographics.
(d) Loneliness is not a correlate of suicide ideation, independent of depressive symptoms.
(e) Loneliness does not predict suicide ideation across time, independent of depressive symptoms.

Methods

Procedure

Data were collected from the assessment at Time 1 (T1) and Time 2 (T2) of the High School Loneliness Study (HSLS), a Danish national study. The study was approved by an institutional review board at Aarhus University. Based on previous research (Cacioppo et al. 2006a; Weeks et al. 1980) a 1-year measurement interval was judged to be a reasonable time period for investigating the relationships among the specific study variables. The schools included in the study offer courses following 9 or 10 years of education in primary and lower secondary school. A high school diploma gives access to higher education. The large majority of all Danish high school students take one of four types of courses. Two-thirds attend one of two courses offering liberal education, whereas the last third attends one of two courses offering vocational education (Statistics Denmark 2006; based on 2004 figures).

The sample was stratified, using the number of students in counties to define 10 different areas of approximately equal size. From these 10 areas, 60 randomly selected high schools were approached with the purpose of recruiting one randomly selected class from each school. The number of liberal versus vocational oriented schools was stratified (2/3:1/3). Initially, no high schools offering one of the two types of liberal education courses responded to the survey, which is the reason why eight additional randomly selected high schools teaching this course were approached, to obtain a more representative distribution of the different courses. The study was introduced to the principal of the selected schools and the procedure securing random selection of one high school class in the first-year group was explained. The class teacher monitored the data collection. Standardized instructions emphasized that optimal testing conditions were to be provided, that the teacher should offer support when needed, and that the students' answers were to be treated confidentially, because the questionnaire included sensitive questions. An accompanying letter informed each student about the nature of the research and that participation was entirely voluntary. The letter also stressed the importance of discretion and explained procedures securing confidentiality. Prior to data collection, a pilot study including 62 students from three different high schools verified that the questionnaire and student letter were understandable to the participating age group.

Participants

Time 1 participants In all, 46 schools agreed to participate and a total of 1009 high school students in the first-year group aged 15–26 years (M=17.11; SD=1.12) participated at T1. Fifty-seven percent of the students were females. The large majority of the students (97%) were between 16 and 19 years old. The non-traditional age of some of the high school students reflects the fact that one of the general high school courses offering liberal education attracts students that have dropped out of a high school course or who have been working after basic school. Comparisons between students of traditional age (15–19 years old) and students of nontraditional age (20–26 years old) did not reveal significant differences on the measures used (T1 & T2). The only exception was social support (the Significant other subscale), where the latter group had a higher score. Between 6 and 30 students participated in each class (M=21.93; SD=5.04), and an average of 85% of the students were present on the day of data collection. The demographic characteristics at T1 are summarized in Table 1. The geographic spread of the participants was satisfactory. Moreover, the reported characteristics of gender, age, country of birth, and the distribution of participants from liberal versus vocational courses resembled general national figures of Danish high school students (see Table 1). In sum, the participants at T1 had a high probability of being representative of Danish high school students in the first-year group.

Time 2 Participants In all, 36 schools agreed to also participate in the second wave of the study including 541 students aged 16–26 years (M=17.11; SD=1.12), corresponding to 54% of the students from T1. Sixty percent of the students were females. The demographic characteristics at T2 are summarized in Table 1. The loss of participants was attributable to: (a) A total of 10 schools that did not approve the second data collection causing attrition of 22% of the original students (A1), and (b) 250 students who were not present at the second data collection because of non-attendance or drop out from the course, causing attrition of 25% of the original students (A2). The remaining participants (RP) were compared at T1 level with A1 and A2, respectively, on all demographics and self-report inventories. As expected, no significant differences were found between the RP and A1 on most demographics and self-report inventories. The only exceptions were the percentage of students born outside Denmark that was significantly higher in A1 compared with the RP, X^2 (1, N=758)=6.18, $p<0.05$, and suicide ideation, where A1 had a higher average than the RP, F(1,756)=5.16, $p<0.05$. In contrast, participants missing because of non-attendance or drop out differed from the remaining participants on several measures. Compared with the RP fewer participants in A2 lived in a nuclear family and a greater number lived alone, X^2 (3, N=772)=11.21, $p<0.05$. Also, the number of students born outside Denmark was significantly higher, X^2 (1, N=791)=15.09, $p<0.01$. Moreover, participants' fathers in A2 appeared to be less educated than fathers of the RP, X^2 (3, N=739)=12.82, $p<0.01$, and the participants of A2 were slightly older than the RP, F(1,788)=11.65, $p<0.005$. Also, differences were significant for depressive symptoms, F(1,789)=7.87, $p<0.01$, suicide ideation, F(1,789)=15.56, $p<0.0005$, and perceived stress, F(1,789)=6.08, $p<0.05$, with A2 showing higher average scores at T1 than the RP. Hence, participants missing because of non-attendance or drop out were found to have a less privileged background and higher levels of symptoms when compared with the retained participants. Because of the high attrition rate and the bias associated with attrition, the participants at T2 cannot be regarded as a representative population-based sample, which is why the results from the longitudinal analyses should be interpreted more tentatively than the results from the cross-sectional analyses based on T1 only.

Table 1 Sample Characteristics and National Characteristics from Statistics Denmark

Variable	Mean (*SD*) or Percentage		
	Time 1 (*N*=1009)	Time 2 (*N*=541)	National Characteristics
Gender, female	57	60	56[a]
Age	17.11 (1.11)	18.06 (1.09)	17.70[b]
Country of birth, Denmark	94	96	96 [a]
High school course (liberal/vocational)	61/38	67/33	69/31 [a]
Education, father/mother			
None, besides basic school (9 –10 years)	11/10	11/9	
Short education (11 –13 years)	44/35	44/34	
Short/medium long higher education (14–17 years)	22/10	24/47	
Long higher education (17+ years)	22/10	21/10	
Living conditions			
Two–parent family	67	–	
Single–parent family	24	–	
Boyfriend/girlfriend	3	–	
Alone	3	–	
Other	3	–	
Residential location			
Rural area or village	15	–	
Small city (≤ 10,000 inhabitants)	31	–	
Large city (> 10,000 inhabitants)	54	–	

[a] National characteristics of Danish high schools students (Statistics Denmark 2008a, based on 2005-figures).

[b] Estimated average age of Danish high schools students based on available figures from different high school courses (Statistics Denmark 2008b, based on 2005-figures).

Measures

A broad range of demographics was included at T1 to control for their possible effects on the association between loneliness and depression (see Table 1). Age, gender, living conditions, residential location, country of birth, and boyfriend/girlfriend status served as covariates. Moreover, parents' education was included as a crude measure of socioeconomic status.

Loneliness was assessed using a Danish version of the UCLA Loneliness Scale (UCLA; Lasgaard 2007; Russell 1996), the most frequently used self-report scale for measuring loneliness in adolescent populations. The scale consists of 20 items and measures general feelings of loneliness. The items are rated on a 4-point Likert scale with higher scores reflecting higher loneliness. The internal consistency of the scale was high (T1 α=0.91; T2 α=0.90).

Depressive symptoms were measured using a Danish version of the Beck Depression Inventory for Youth (BDI-Y; Thastum et al. 2009). The BDI-Y identifies 20 symptoms of depression, scored on a 4-point Likert scale in accordance with the degree of occurrence. One item in the BDI-Y asks if the respondent feels lonely, whereas another item asks if the respondent wishes he was dead. To avoid results influenced by item overlap in regard to the measures of loneliness and suicide ideation, respectively, these two items were excluded prior to the analysis. The internal consistency of the reduced scale was high (T1 α=0.93; T2 α=0.90).

Suicide ideation was measured with the 8-item Suicide Ideation subscale from the Suicide Probability Scale (SPS-SI; Cull and Gill 1988). The SPS-SI reflects the extent to which an individual has thoughts associated with suicide and has proved effective in predicting suicide attempts in adolescents. The symptoms are scored on a 4-point Likert format in accordance with the degree of occurrence and weighted as defined in the manual of the scale. Prior to data collection, the SPS-SI was translated to Danish by the first author, and back-translated by a bilingual psychologist (PhD) with English as first language, and then evaluated by the first author and students in the pilot study. The scale had a high internal consistency (T1 α=0.90; T2 α=0.87).

Whereas loneliness, depressive symptoms, and suicide ideation were measured at both waves, all other self-report inventories were included at T1 only to determine if loneliness was associated with depressive symptoms independently of these factors. Anxiety was measured using the

Danish version of the Beck Anxiety Inventory for Youth (Thastum et al. 2009). The inventory identifies 20 symptoms of anxiety, scored on a 4-point Likert scale in accordance with the degree of occurrence. The internal consistency of the scale was high (α=0.87). Furthermore, measures of social support, network orientation, perceived stress, and social desirability were included. Prior to data collection, the scales used were adapted to Danish using the same procedure as with the SPS-SI. Perceived social support was measured using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al. 1988), which contains three subscales indexing perceived support from family, friends, and a significant other (SO). The MSPPS is scored on a 7-point Likert scale. Higher scores indicate greater social support. The internal consistency of the subscales were high ($\alpha_{\text{MSPPS-Family}}$=0.90; $\alpha_{\text{MSPPS-Friends}}$=0.90; $\alpha_{\text{MSPPS-SO}}$=0.92). As stressed by Vaux et al. (1986), support resources of whatever quality are useless if the individual is reluctant to utilize them. Therefore, the Network Orientation Scale (NOS; Vaux et al. 1986) was included to control for the willingness to make use of social support resources. The NOS comprises 20 items, scored on a 4-point Likert scale. Higher scores on the scale indicate poor network orientation. The NOS showed good internal consistency (α=0.77). Perceived stress was measured with the 10-item version of the Perceived Stress Scale (PSS; Cohen and Williamson 1988) that investigates how stressful the respondent appraises life to have been within the last month. The scale is scored on a 5-point Likert scale. Higher scores indicate greater perceived stress. The internal consistency of the scale was high (α=0.84). Finally, a 13-item short version (MC Form C; Reynolds 1982) of the Marlowe-Crowne Social Desirability Scale (MC; Crowne and Marlowe 1960) was included to control for social desirability. The MC Form C correlates highly with the full-length instrument and is scored on a 2-point scale (true or false). The adapted scale showed modest internal consistency in the study (α=0.62).

Results

Data Analysis

Prior to data analysis, the data were screened for errors. The percentage of missing values was acceptable (0.0–13.6%). Thus, the Expectation Maximization algorithm, which has been demonstrated to be an effective method of dealing with missing data (Twala 2009), was performed to impute missing data on all scales included. At the cross-sectional level, hierarchical regression analyses (HRA) were performed with depression as the dependent variable. In Step 1 loneliness was entered to get a pure estimate of the relationship between the two key variables in the analysis (i.e., loneliness and depression). In Step 2 we investigated the specificity of the relationship between loneliness and depression by controlling for the effect of demographic factors. In Step 3 we expanded the analysis of loneliness as a specific correlate of depression by entering psychosocial variables previously associated with loneliness and depressive symptoms (i.e., anxiety, social support, perceived stress, and network orientation). In Step 4 we challenged the full model by controlling for the effect of social desirability. Also, HRA were performed with suicide ideation as the dependent variable. In Step 1 loneliness was entered to get a pure estimate of the relationship between the two key variables in the analysis (i.e., loneliness and suicide ideation). In Step 2 we investigated the specificity of the relationship between loneliness and suicide ideation by controlling for the effect of demographic factors. In Step 3 we expanded the analysis of loneliness as a specific correlate of suicide ideation by controlling for the effect of depression, which consistently has been associated with loneliness and suicide ideation. In Step 4, we challenged the full model by controlling for the effect of social desirability. To simplify the HRAs, the educational level of the mothers and fathers of the participants were combined and treated as a single variable. Living conditions were recoded into dummy variables, that is, living in a nuclear family, living with a boyfriend/girlfriend, and living alone, respectively.

For the longitudinal analysis, SEM was used to estimate the parameters of two-wave cross-lagged panel models using LISREL 8.54. Cross-lagged panel models are useful for discovering if there are any longitudinal reciprocal associations between latent variables. The cross-lagged panel model including loneliness, depression, and suicide ideation at T1 and T2 was specified in accordance with the hypotheses of the study (see Fig. 1). Three parcels were created for each latent variable by randomly allocating items to one of three parcels. These parcels were used as indicators of the latent variables. Parceling has several advantages in the modeling of latent variables in terms of simplifying the model. SEM analyses proceeded in two phases, that is, a measurement phase followed by a structural phase, because the invariance of a measurement model across time needed to be assessed before estimating structural paths. Invariance ensures that the meaning of the variable does not change over the time span of the study (Meredith and Horn 2001). A stepwise approach was used to test for longitudinal invariance (Bollen 1989). First, the general model without any longitudinal invariance assumptions was estimated (Model A). Covariances between errors of the same indicator variables were allowed across time (Wiley and Wiley 1974). Second, the factor loadings of the same indicator variables were constrained to be equal

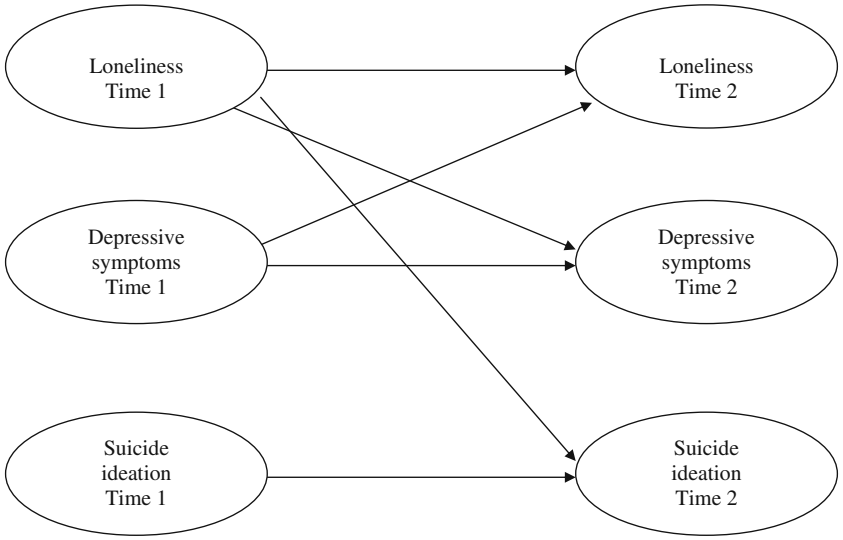

Fig. 1 Theoretical cross-lagged panel model. *Note.* All concurrent correlations are controlled for but these arrows are omitted from the figure for reasons of clarity

across time (Model B), because factorial invariance implies that the relation of the latent variables to the manifest variables is constant over time (Marsh 1994). Longitudinal invariance holds when these constraints on the factor loadings are not accompanied by a significant reduction in model fit. In the next step, the autoregressive effects were investigated, controlling for all concurrent correlations (Model C). These effects can be thought of as indicators of the temporal stability of the three constructs. Then, the structural models (Models D through F) and the full reciprocal model, including all cross-lagged paths (Model G) were assessed. Subsequently, the best fitting model was trimmed (Model H) by excluding non-significant cross-lagged paths from the independent variables. Finally, we estimated a modified model, excluding suicide ideation and an expanded model, including gender and other demographic factors.

The models were estimated using maximum likelihood. As suggested (Hoyle and Panter 1995), the models were assessed with a range of fit indices including the Satorra-Bentler scaled chi-square (S-Bχ^2), the Incremental Fit Index (IFI; Bollen 1989), and the Comparative Fit Index (CFI). A non-significant S-Bχ^2 and values greater than 0.95 for the IFI and CFI are considered to reflect acceptable model fit (Hu and Bentler 1999). Additionally, the Root Mean Square Error of Approximation (RMSEA) was reported. A RMSEA value of .06 or less is considered to indicate a good fit (Hu and Bentler 1999). The comparative fit was assessed using the Expected Cross Validation Index (ECVI; Browne and Cudeck 1989) with the smallest ECVI value being indicative of the best fitting model. Moreover, detailed inspection of the best fitting model was used to examine the specific cross-lagged effects, followed by the deletion of non-significant paths.

Cross-sectional Analysis

Table 2 presents the descriptive statistics and the correlations among the variables in the cross-sectional study. The results of the HRA with depressive symptoms as the dependent variable can be seen in Table 3. Step 1 replicated previous research showing that higher levels of reported loneliness are associated with higher levels of depressive symptoms in adolescence, β=0.61, p<0.0005. When adding gender and the other demographics in Step 2, female gender was associated with more depressive symptoms, whereas living in a two-parent family was associated with fewer depressive symptoms. However, these covariates had little effect on the strength of the association between loneliness and depressive symptoms. When the psychosocial variables were included in the model in Step 3, anxiety was associated with more depressive symptoms independent of loneliness and demographics. In addition, social support from the family and a high network orientation were associated with fewer depressive symptoms, whereas perceived stress was associated with more depressive symptoms. However, loneliness remained a significant predictor of depressive symptoms with a considerable effect size, β=0.30, p<0.0005, and compared with loneliness and anxiety, the effect size of social support from the family, network orientation, and perceived stress was small. Hence, they had little effect on the strength of the association between loneliness and depressive symptoms. In Step 4 we included social desirability as a control variable, which did not change the explained variance, ΔR^2=0%, *ns*, or the strength of any of the predictors. For simplicity, the result of Step 4 is not shown in Table 3.

The results of the HRA with suicide ideation as the dependent variable can be seen in Table 4. Step 1 replicated previous findings showing that loneliness is associated with

suicide ideation in adolescence, β=0.38, p<0.0005. The inclusion of gender and the other demographics as covariates in Step 2 did not change the strength of the association between loneliness and suicide ideation, although high parental education was associated with lower levels of suicide ideation. When depression was included in the model in Step 3, depressive symptoms were highly associated with higher levels of suicide ideation independent of loneliness and demographics, β=0.71, p<0.0005, and outweighed the predictive validity of loneliness, β=−0.05, *ns*. In Step 4 we included social desirability as a control variable, which did not change the overall result.

Longitudinal Analysis

Table 5 presents the descriptive statistics and the correlations among the study variables in the longitudinal analysis. All the variables were significantly correlated within the range of 0.25 to 0.66, all *p*s<0.0005, suggesting associations among the three constructs at both time points. The fit indices of the models assessed can be seen in Table 6. First, the longitudinal invariance of the measurement model was established. Model A (i.e., the model without invariance constraint) showed an adequate fit to the data. However, setting the factor loadings as equivalent over time in Model B was not associated with a significant decrease in fit, S-B$\chi^2\Delta$=7.01; 9 *df* more, p=0.63, demonstrating the longitudinal invariance of the measurement part of the model. Second, the auto-regressive effects were estimated in Model C, UCLA=0.58; BDI-Y=0.54; SPS-SI=0.59; all *p*s<0.05, suggesting that all three latent variables remained rather stable across time. Third, all the structural models (i.e., Models D through F) and the full reciprocal model (i.e., Model G) were estimated. The S-Bχ^2s were statistically significant, but this finding should not lead to rejection of the models, because the large sample size increases the power of the test (Tanaka 1987).On the basis of the criteria associated with RMSEA, IFI and CFI all the models were judged to exhibit acceptable model fit. Moreover, the comparative fit was assessed with the ECVI and the chi-square/df ratios with the smallest values being indicative of the best fitting model. This assessment suggested that the model with paths from depressive symptoms (T1) to loneliness and suicide ideation (T2), that is Model E, is the best fitting model.

Detailed inspection of Model E revealed that the cross-lagged path from depressive symptoms (T1) to loneliness (T2) was significant, β=0.22, p<0.05, implying that depressive symptoms predict higher loneliness across time. Detailed inspection of the model also indicated that depressive symptoms did not predict suicide ideation across time, β=0.05, *ns*. Trimming the best fitting model (i.e., Model E), aiming for the most parsimonious solution, the non-significant path was excluded in Model H. Model E was not a significantly better fit when compared with Model H, S-B$\chi^2\Delta$=2.30; 1 *df* more, p=0.13. Thus, the trimmed model (i.e., Model H) was considered to be the best description of the data (see Fig. 2). To ensure that the inclusion of suicide ideation in the model did not mask a reciprocal relationship between loneliness and depressive symptoms, a modified model was specified, excluding suicide ideation. The modified model showed adequate fit (fit indices not shown). Again, detailed inspection of the model indicated that only the path from depressive symptoms (T1) to loneliness (T2) was significant, β=0.24, p<0.05. Finally, the trimmed model was challenged by including gender and other demographic factors from the first wave. As a first step, multivariate analysis of variance (MANOVA) was conducted with the demographics (T1) as between-subject variables and the self-report inventories from the general model as dependent variables. An overall multivariate effect was found for gender, Wilks′ λ=0.96, F(6, 534)=12.77, p<0.001, h^2=0.13, boyfriend/girlfriend status, Wilks′ λ=0.98, F(6, 534)=2.12, p<0.05, h^2=0.03, and the type of high school course, Wilks′ λ=0.95, F(6, 534)=4.63, p<0.001, h^2=0.05. Thus, these three factors were added to the trimmed model, where they were treated as latent variables and defined as predictors of loneliness, depressive symptoms, and suicide ideation at both time points (fit indices not shown). The model showed adequate fit (fit indices not shown). Again, detailed inspection of the model indicated that only the cross-lagged path from depressive symptoms (T1) to loneliness (T2) was significant, β=0.22, p<0.05, whereas the paths from gender, boyfriend/girlfriend status, and the type of high school course to T2 loneliness, depressive symptoms, and suicide ideation were non-significant. Re-running the analysis with the full reciprocal model did not change this result (fit indices not shown).

Discussion

At the cross-sectional level, the present study indicates that loneliness remains a correlate of depressive symptoms when controlling for gender and other demographic factors, multiple psychosocial variables, and social desirability. That is, a broad range of demographics and related constructs cannot explain the association between loneliness and depression in adolescence. As mentioned earlier, the specificity of the association has been indicated by studies that have controlled for the effect of different variables in diverse samples. However, the present study is the first to control for a broad range of variables in a representative adolescent sample. Only the inclusion of anxiety as a covariate had a substantial impact on the association between loneliness and depressive symptoms, diminishing it by half. Thus, one could assume that the relationship between loneliness and depression is

Table 2 Descriptive Statistics and Correlations Among the Variables in the Cross-Sectional Study (N=1009)

Measure	1	2	3	4	5	6	7	8	9	10
1. Loneliness	–	0.61***	0.39***	0.51***	−0.33***	−0.30***	−0.44***	0.53***	0.46***	0.18***
2. Depressive symptoms			0.68***	0.77***	−0.12***	−0.28***	−0.18***	0.28***	0.58***	0.24***
3. Suicide ideation				0.52***	−0.13***	−0.26***	−0.12***	0.21***	0.37***	0.10**
4. Anxiety					−0.07*	−0.21***	−0.14***	0.27***	0.56**	0.26***
5. Social support, SO						0.42***	0.69***	−0.40***	−0.03	−0.02
6. Social support, Fam							0.44***	−0.28***	−0.25***	−0.13***
7. Social support, Fri								−0.54***	−0.12***	−0.06
8. Network orientation									0.24***	0.16***
9. Perceived stress										0.28***
10. Social desirability										–
Means (*SD*)	36.17 (9.17)	25.68 (7.72)	9.76 (4.35)	30.42 (7.04)	23.77 (4.97)	22.21 (5.57)	23.14 (4.50)	40.76 (6.14)	17.40 (5.90)	19.04 (2.61)

SO Significant other; *Fam* Family; *Fri* Friends.

*p<0.05. ** p<0.005. *** p<0.0005

partly mediated by anxiety. Unfortunately, this interesting finding could not be investigated at the longitudinal level in the present study. Indeed, future studies would benefit from including anxiety at both points in time into the model. Also, further understanding of the relationship between loneliness and depression could be gained by including other anxiety-related variables to the model such as social phobia and shyness

As mentioned in the Introduction, the interpersonal-psychological theory of suicide stresses that thwarted belongingness is one of three precursors of suicidal behavior (Joiner 2005). However, one limitation of the literature on interper-

Table 3 Hierarchical Regression Analysis With Depressive Symptoms as Dependent Variable

Variable	Step 1	Step 2	Step 3
Loneliness	0.61***	0.60***	0.30***
Age		0.00	0.00
Gender		0.20***	0.08***
Parental education		−0.01	0.01
Living in two-parent family		−0.07*	−0.01
Living with boyfriend/girlfriend		0.00	−0.02
Living alone		−0.03	0.01
Residential location		0.00	0.01
Country of birth		0.04	0.01
Boyfriend/girlfriend		−0.01	0.00
High school course		−0.01	−0.02
Anxiety			0.54***
Social support, Fam			−0.07**
Social support, Fri			0.03
Social support, SO			0.01
Network orientation			−0.06*
Perceived stress			0.12***
Model R^2 (%)	37	42	69
Δ R^2 (%)		5***	27***
F(df)	F(1,947)=560	F(11,937)=62	F(17,931)=123

Fam Family; *Fri* Friends; *SO* Significant other.

p<0.05. ** p<0.005. *** p<0.0005.

Table 4 Hierarchical Regression Analysis With Suicide Ideation as Dependent Variable

Variable	Step 1	Step 2	Step 3	Step 4
Loneliness	0.38***	0.38***	−0.05	−0.05
Age		0.05	0.05	0.04
Gender		0.04	−0.10***	−0.11***
Parental education		−0.09**	−0.08**	−0.08**
Two-parent family		−0.05	0.00	0.00
Living with boyfriend/girlfriend		−0.04	−0.04	−0.04
Living alone		−0.07	−0.05	−0.05
Residential location		−0.03	−0.03	−0.03
Birth place		0.06	0.03	0.03
Boyfriend/girlfriend		−0.02	−0.01	−0.01
High school course		−0.02	−0.01	−0.01
Depressive symptoms			0.71***	0.73***
Social desirability				0.06*
Model R^2 (%)	14	15	45	45
Δ R^2 (%)		2*	30***	<1*
F(df)	*F*(1,947)=159	*F*(11,937)=17	*F*(12,936)=66	*F*(13,935)=62

* $p<0.05$. ** $p<0.005$. *** $p<0.0005$.

sonal risk factors of adolescent suicidality is that subjective measures of interpersonal functioning rarely have been used (Conner et al. 2007). The present study indicates that, although correlated with suicide ideation, the subjective experience of loneliness is not related to the latter construct independent of depressive symptoms at the cross-sectional level. The mixed findings of previous studies that have examined loneliness as a specific correlate of suicide ideation and behavior may be attributed to differences in methodology (e.g., different measures and levels of representativeness of the samples) and differences in degrees of loneliness, depression, and suicidality (e.g., non-clinical vs. clinical samples; suicide ideation vs. suicide attempts).

The social desirability response bias is a potential flaw when using self-report scales to measure undesirable feelings. From this perspective, assessments of loneliness, depression, and suicide ideation are at risk of underreporting, because some participants may respond to items in manners that they perceive to be viewed as favorable, rather than give answers that reflect their actual feelings and experiences. Hence, it is a strength of the present study that social desirability was included as a control variable in the cross-sectional analysis.

Loneliness as Predictor of Depressive Symptoms Across Time

By means of cross-lagged panel models, the analyses were extended using longitudinal data to explore whether loneliness and depressive symptoms predicted subsequent differences in loneliness and depressive symptoms. The results indicated that loneliness did not predict a difference in depressive symptoms across time, independent of initial depressive symptoms, subsequent loneliness, and demographics. This result is slightly surprising given the many researchers who have pointed to the interactional nature of depression (e.g., Hammen 1999; Joiner et al. 1999a). In fact, it seems to be a general perception that loneliness is more likely to be predictive of depression than the reverse (e.g.,

Table 5 Descriptive Statistics and Correlations Among the Variables in the Longitudinal Study

Measure	1	2	3	4	5	6
1. Loneliness (T1)	–	0.62***	0.57***	0.37***	0.25***	0.20***
2. Loneliness (T2)			0.52***	0.61***	0.25***	0.37***
3. Depressive symptoms (T1)				0.66***	0.58***	0.44***
4. Depressive symptoms (T2)					0.36***	0.58***
5. Suicide ideation (T1)						0.59***
6. Suicide ideation (T2)						–
Means	36.17	34.69	25.32	26.20	9.30	9.08
(*SD*)	(8.77)	(8.04)	(6.70)	(6.28)	(3.29)	(2.99)

T1 Time 1; *T2* Time 2.
*** $p<0.0005$.

Table 6 Fit Indices for the Alternative Models

Index	Model A: Measurement model with correlated errors across time	Model B: Model A with invariant factor loadings	Model C: Model B with stability coefficients added	Model D: Model C with path from loneliness T1 to depression and suicide ideation T2	Model E: Model C with path from depression T1 to loneliness and suicide ideation T2	Model F: Model C with path from suicide ideation T1 to loneliness and depression T2	Model G: Full reciprocal model with all paths from Models D through F	Model H: Trimmed model with path from depression T1 to loneliness T2
S-Bχ^2 *df* (*p*)	137.60 111(0.04)	140.49 120(*ns*)	435.20 123(0.00)	426.77 121(0.00)	395.44 121(0.00)	417.84 121(0.00)	392.15 117(0.00)	398.09 122(0.00)
RMSEA (CI)	0.02(0.00–0.03)	0.02(0.00–0.03)	0.07(0.06–0.08)	0.07(0.06–0.08)	0.06(0.06–0.07)	0.07(0.06–0.07)	0.07(0.06–0.07)	0.06(0.06–0.07)
ECVI (CI)	0.48(0.43–0.54)	0.45(0.41–0.51)	0.98(0.87–1.09)	0.98(0.87–1.10)	0.92(0.81–1.04)	0.96(0.85–1.08)	0.93(0.82–1.05)	0.92(0.81–1.04)
IFI	0.99	0.99	0.97	0.97	0.97	0.97	0.97	0.97
CFI	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97

S-Bχ^2 Satorra-Bentler scaled chi-square; *RMSEA* Root Mean Square Error of Approximation; *CI* 90% Confidence Intervals; *ECVI* Expected Cross Validation Index; *IFI* Incremental Fit Index, *CFI* Comparative Fit Index; *T1* Time 1; *T2* Time 2.

Dill and Anderson 1999). This perception has been supported by studies mentioned earlier that have found loneliness to correlate with depressive symptoms across time. However, with the exception of the recent study by Cacioppo et al. (2006a), previous studies did not investigate the relationship across time independent of the cross-sectional relations and time effects. Given that loneliness and depression are highly correlated and rather stable constructs, a complete investigation of the longitudinal relationship must be independent of cross-sectional relations and time effects. By using such a comprehensive design, the present study challenges the validity of previous studies that have associated adolescent loneliness with later depressive symptoms.

One possible explanation of the result is purely methodological. Cacioppo et al. (2006a) included three measurement waves in their study, whereas the present study included just two. Sampling at a greater number of points in time, obviously, offers a more complete picture of the relationship between the variables. Therefore, it remains possible that a relationship between loneliness and depression across time may be discovered using a more extensive design with several measurement waves. Another possible explanation of the difference between the findings of the present study and the ones reported by Cacioppo et al. (2006a) may be age-related differences with regard to the meaning and experience of loneliness and depression. The absence of good comparative data across age categories makes it difficult to explore the possibility of such age-related differences. However, the test-retest reliabilities of loneliness (1 year apart) were lower in the adolescents compared with the middle-aged and older adults (r=0.62 vs. 0.76 and 0.84; Cacioppo et al. 2006a). Hence, loneliness may be more situational and fluctuating in adolescence than in middle-age and old-age and therefore less likely to be predictive of later depressive symptoms in this age group.

Depressive Symptoms as Predictor of Loneliness Across Time

Although depression has received less attention as an antecedent of loneliness than vice versa, the present study did indicate that higher levels of depressive symptoms predict higher loneliness in adolescence across time independent of cross-sectional relations and time effects. This finding was also reported by Cacioppo et al. (2006a) in the study with middle-aged and older adults, suggesting no age-related differences in the relationship between depression and loneliness across time. Clearly, one reason why depression may predict more loneliness is that several depression-related mechanisms seem to produce an array of interpersonal problems (Joiner 2000). Some depressed people repeatedly seek reassurance from their friends and family, which may generate negative interpersonal outcomes, such

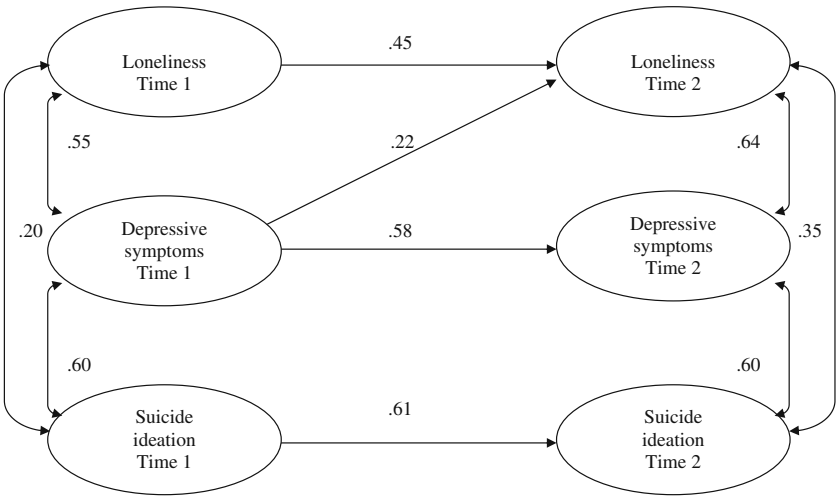

Fig. 2 Completely standardized solution of the structural part of Model H. *Note.* All coefficients given are significant at $p<0.05$

as rejection (Joiner et al. 1999b). In fact, it has been shown that people who report depressive symptoms are negatively evaluated by significant others only if they are excessive in reassurance seeking (e.g., Joiner 1999). Also, depression is clearly associated with negative feedback seeking and interpersonal avoidance (Joiner 2000) as well as impairments in social skills (e.g., impairments in paralinguistic behaviors, speech content, and facial expression; Segrin and Abramson 1994). Moreover, negative appraisals and perceived social failures associated with depressive symptoms may make the negative aspects of interpersonal relationships more salient, increasing the risk of feeling lonely (Young 1982). Finally, environmental reactions to depressed people may increase loneliness. People tend to hold a negative view of and behave and respond more negatively toward depressed people than non-depressed people, reflecting a withdrawal of social support and disruption of attachment (Sacco 1999). Also, the development of negatively biased and autonomous cognitive representations of depressed people in the minds of others may increase the risk of social deprivation (Joiner 2000). Notably, the negative interpersonal consequences of depression suggests the importance of early identification and treatment, as there may be long term social consequences, for instance, loneliness.

Loneliness as Predictor of Suicide Ideation

In accordance with the finding that loneliness was not a cross-sectional predictor of suicidal ideation independent of depressive symptomatology, loneliness did not predict differences in suicide ideation across time independent of depressive symptoms, cross-sectional relations and time effects. Likewise, it has been found that commonly endorsed reasons for suicide attempts in adolescence are intrapersonal rather than interpersonal and that depression but not loneliness is important when differentiating suicide attempters who wish to die from those who do not (Boergers et al. 1998). These findings suggest that if loneliness increases the risk of suicide ideation in adolescence, it is an indirect relationship mediated by depression. We are aware of no prior studies that have examined the validity of loneliness as a predictor of both current and later suicide ideation independent of depressive symptoms, and so this novel finding requires replication in a fully representative sample.

Depression as Predictor of Suicide Ideation

As expected, depressive symptoms were a strong predictor of suicide ideation at the cross-sectional level. However, depressive symptoms did not predict later suicide ideation independent of cross-sectional relations and time effects. Likewise, in a study of elderly people depressive symptoms did not predict suicide ideation 8 months later when adjusting for suicide ideation at baseline (Chou 2006). These findings underline the importance of distinguishing between cross-sectional and cross-lagged relationships when investigating adolescent depression and suicidality. The finding that current depression appears to be a stronger predictor of suicidal ideation than past depression is meaningful, although more continuity between the assessments could have been expected. Moreover, it is likely that current depressive symptoms are an important risk factor for future suicide attempts as indicated by a prospective high school study (Lewinsohn et al. 1994).

Limitations and Conclusion

In interpreting the findings, some limitations of the analysis should be mentioned. Whereas the use of a stratified, representative sample of high school students is a clear strength of the cross-sectional study, the high rate of attrition at T2 is a clear weakness of the longitudinal study. Attrition

is a common and challenging problem for longitudinal research, which threatens the internal and external validity of the analysis conducted. The attrition problem in the present study is troublesome, given that students who were not present at T2 because of non-attendance or drop out from the course, had a less privileged background and reported higher levels of symptoms at T1 when compared with the retained participants. Thus, the results from the longitudinal analyses should be interpreted with caution. Moreover, the non-clinical nature of the sample should be kept in mind with regard to the generalization of the results as the overall low level of symptom severity in the non-clinical sample could have influenced the findings. This point is particular important to stress as the study fail to replicate previous studies of which some where conducted using clinical samples.

Also worth considering is the construct of loneliness. The UCLA seems to tap peer-related loneliness more so than family-related loneliness in adolescence (Goossens et al. 2009). Thus, future research may explore the possibility that different types of loneliness are differently related to depressive symptoms and suicide ideation. In addition, the study exclusively relies on self-report measures and is therefore at risk of common method variance. Future studies would clearly benefit from employing multimodal assessments.

With these caveats in mind, the cross-sectional analysis of the current study clearly indicates the existence of a specific association between loneliness and depressive symptoms in adolescence. Furthermore, the study points at depressive symptoms as an antecedent of adolescent loneliness and challenges the general perception that loneliness predicts depression. Finally, the cross-sectional and longitudinal analyses of the present study indicate that loneliness in adolescence is not associated with current and future suicide ideation when controlling for depressive symptoms.

References

Alpass, F. M., & Neville, S. (2003). Loneliness, health and depression in older males. *Aging and Mental Health, 7*, 212–216.

Boergers, J., Spirito, A., & Donaldson, D. (1998). Reasons for adolescent suicide attempts: associations with psychological functioning. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 1287–1293.

Bonner, R. L., & Rich, A. R. (1991). Predicting vulnerability to hopelessness: a longitudinal analysis. *Journal of Nervous and Mental Disease, 179*, 29–32.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Browne, M. W., & Cudeck, R. (1989). Single sample cross-validation indices for covariation structures. *Multivariate Behavioral Research, 24*, 445–455.

Cacioppo, J. T., Hughes, M. E., Waite, L. J., Hawkley, L. C., & Thisted, R. A. (2006a). Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. *Psychology and Aging, 21*, 140–151.

Cacioppo, J. T., Hawkley, L. C., Ernst, J. M., Burleson, M., Berntson, G. G., Nouriani, B., et al. (2006b). Loneliness within a nomological net: an evolutionary perspective. *Journal of Research in Personality, 40*, 1054–1085.

Chou, K. L. (2006). Reciprocal relationship between suicidal ideation and depression in Hong Kong elderly Chinese. *International Journal of Geriatric Psychiatry, 21*, 594–596.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapam & S. Oskamp (Eds.), *The social psychology of health* (pp. 31–67). Newbury Park: Sage.

Conner, K. R., Britton, P. C., Sworts, L. M., & Joiner, T. (2007). Suicide attempts among individuals with opiate dependence: the critical role of belonging. *Addictive Behaviors, 32*, 1395–1404.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349–354.

Cull, J. G., & Gill, W. S. (1988). *Suicide probability scale (SPS) manual*. Los Angeles: Western Psychological Services.

Dill, J. C., & Anderson, C. A. (1999). Loneliness, shyness, and depression. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression* (pp. 93–125). Washington, DC: American Psychological Association.

Garnefski, N., Diekstra, R. F., & de Heus, P. (1992). A population-based survey of the characteristics of high school students with and without a history of suicidal behavior. *Acta Psychiatrica Scandinavica, 86*, 189–196.

Goossens, L., Lasgaard, M., Luyckx, K., Vanhalst, J., Mathias, S., & Masy, E. (2009). Loneliness and solitude in adolescence: a confirmatory factor analysis of alternative models. *Personality and Individual Differences, 47*, 890–894.

Grøholt, B., Ekeberg, Ø., Wichstrøm, L., & Haldorsen, T. (2000). Young suicide attempters: a comparison between a clinical and an epidemiological sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 868–875.

Hagerty, B. M., & Williams, A. R. (1999). The effects of sense of belonging, social support, conflict and loneliness on depression. *Nursing Research, 48*, 215–219.

Hammen, C. (1999). The emergence of an interpersonal approach to depression. In T. Joiner & J. Coyne (Eds.), *The interactional nature of depression* (pp. 21–35). Washington, DC: American Psychological Association.

Heikkinen, R. L., & Kauppinen, M. (2004). Depressive symptoms in late life: a 10-year follow-up. *Archives of Gerontology and Geriatrics, 38*, 239–250.

Heinrich, L. M., & Gullone, E. (2006). The clinical significance of loneliness: a literature review. *Clinical Psychology Review, 26*, 695–718.

Hoyle, R. H., & Panter, A. T. (1995). Writing about structural equation models. In R. H. Hoyle (Ed.), *Structural equation modeling* (pp. 158–198). London: Sage.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Jackson, J., & Cochran, S. D. (1991). Loneliness and psychological distress. *Journal of Psychology, 125*, 257–262.

Joiner, T. E. (1997). Shyness and low social support as interactive diatheses, with loneliness as mediator: testing an interpersonal-personality view of vulnerability to depressive symptoms. *Journal of Abnormal Psychology, 106*, 386–394.

Joiner, T. E. (1999). A test of interpersonal theory of depression in youth psychiatric inpatients. *Journal of Abnormal Child Psychology, 27*, 77–85.

Joiner, T. E. (2000). Depression's vicious scree. *Clinical Psychology, 7*, 203–218.

Joiner, T. (2005). *Why people die by suicide*. Cambridge: Harvard University Press.

Joiner, T., Coyne, J. C., & Blalock, J. (1999a). On the interpersonal nature of depression: overview and synthesis. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression* (pp. 3–19). Washington, DC: American Psychological Association.

Joiner, T. E., Metalsky, G. I., Katz, J., & Beach, S. R. H. (1999b). Depression and excessive reassurance-seeking. *Psychological Inquiry, 10*, 269–278.

King, C. A., & Merchant, C. R. (2008). Social and interpersonal factors relating to adolescent suicidality: a review of the literature. *Archives of Suicide Research, 21*, 181–196.

Koenig, L. J., & Abrams, R. F. (1999). Adolescent loneliness and adjustment: a focus on gender differences. In K. J. Rotenberg & S. Hymel (Eds.), *Loneliness in childhood and adolescence* (pp. 296–322). New York: Cambridge University Press.

Larson, R. W. (1999). The uses of loneliness in adolescence. In K. J. Rotenberg & S. Hymel (Eds.), *Loneliness in childhood and adolescence* (pp. 296–322). New York: Cambridge University Press.

Lasgaard, M. (2007). Reliability and validity of the Danish version of the UCLA loneliness scale. *Personality and Individual Differences, 42*, 1359–1366.

Lebret, S., Perret-Vaille, E., Mulliez, A., Gerbaud, L., & Jalenques, I. (2006). Elderly suicide attempters: characteristics and outcome. *International Journal of Geriatric Psychiatry, 21*, 1052–1059.

Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1994). Psychosocial risk factors for future adolescent suicide attempt. *Journal of Consulting and Clinical Psychology, 62*, 297–305.

Mahon, N. E., Yarcheski, A., Yarcheski, T. J., Cannella, B. L., & Hanks, M. M. (2006). A meta-analytic study of predictors for loneliness during adolescence. *Nursing Research, 55*, 308–315.

Marsh, H. W. (1994). Confirmatory factor analysis models of factorial invariance: A multifaceted approach. *Structural Equation Modeling, 1*, 5–34.

Mellor, D., Stokes, M., Firth, L., Hayashi, Y., & Cummins, R. (2008). Need for belonging, relationship satisfaction, loneliness, and life satisfaction. *Personality and Individual Differences, 45*, 213–218.

Meredith, W., & Horn, J. L. (2001). The role of factorial invariance in modeling growth and change. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 203–240). Washington, DC: American Psychological Association.

Pagliaro, L. A. (1995). Adolescent depression and suicide: A review and analysis of the current literature. *Canadian Journal of School Psychology, 11*, 191–201.

Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne social desirability scale. *Journal of Clinical Psychology, 38*, 119–125.

Rich, A., & Bonner, R. L. (1987). Concurrent validity of a stress-vulnerability model of suicidal ideation and behavior. *Suicide and Life-Threatening Behavior, 17*, 265–270.

Rich, A. R., Kirkpatrick-Smith, J., Bonner, R. L., & Jans, F. (1992). Gender differences in the psychosocial correlates of suicide ideation among adolescents. *Suicide and Life-Threatening Behavior, 22*, 364–373.

Roberts, R. E., Roberts, C. R., & Chen, Y. R. (1998). Suicidal thinking among adolescents with a history of attempted suicide. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 1294–1300.

Rotenberg, K. J., McDougall, P., Boulton, M. J., Vaillancourt, T., Fox, C., & Hymel, S. (2004). Cross-sectional and longitudinal relations among peer-reported trustworthiness, social relationships, and psychological adjustment in children and early adolescents from the United Kingdom and Canada. *Journal of Experimental Child Psychology, 88*, 46–67.

Russell, D. W. (1996). UCLA loneliness scale (Version 3): reliability, validity, and factor structure. *Journal of Personality Assessment, 66*, 20–40.

Sacco, W. P. (1999). A social-cognitive model of interpersonal processes in depression. In T. Joiner & J. C. Coyne (Eds.), *The interactional nature of depression* (pp. 329–362). Washington, DC: American Psychological Association.

Sacco, W. P., & Vaughan, C. A. (2006). Depression and the response of others. In T. E. Joiner, J. S. Brown, & J. Kistner (Eds.), *The interpersonal, cognitive, and social nature of depression* (pp. 101–132). Mahwah: Erlbaum.

Segrin, C., & Abramson, L. Y. (1994). Negative reactions to depressive behaviors: a communication theories analysis. *Journal of Abnormal Psychology, 103*, 655–668.

Statistics Denmark (2006). *Students in upper secondary school by education, region, ancestry, national origin and sex.* Retrieved November 15, 2006, from Statistics Denmark via www.statistikbanken.dk/U191.

Statistics Denmark (2008a). *Students in upper secondary school by education, region, ancestry, national origin and sex.* Retrieved September 14, 2008, from Statistics Denmark via www.statistikbanken.dk/U191.

Statistics Denmark (2008b). *Students by education, age, ancestry, national origin and sex.* Retrieved September 14, 2008, from Statistics Denmark via www.statistikbanken.dk/U13.

Tanaka, J. S. (1987). "How big is big enough?": Sample size and goodness of fit in structural equation models with latent variables. *Child Development, 58*, 134–146.

Thastum, M., Ravn, K., Sommer, S., & Trillingsgaard, A. (2009). Reliability, validity and normative data for the Danish Beck Youth Inventories. *Scandinavian Journal of Psychology, 50*, 47–54.

Twala, B. (2009). Empirical comparison of techniques for handling incomplete data using decision trees. *Applied Artificial Intelligence, 23*, 373–405.

Vaux, A. C., Burda, P. C., & Stewart, D. (1986). Orientation toward utilization of support resources. *Journal of Community Psychology, 14*, 159–170.

Weber, B., Metha, A., & Nelsen, E. (1997). Relationships among multiple suicide ideation risk factors in college students. *Journal of College Student Psychotherapy, 11*, 49–64.

Weeks, D. G., Michela, J. L., Peplau, L. A., & Bragg, M. E. (1980). Relation between loneliness and depression: a structural equation analysis. *Journal of Personality and Social Psychology, 39*, 1238–1244.

Wiley, J. A., & Wiley, M. G. (1974). A note on correlated errors in repeated measurements. *Sociological Methods and Research, 3*, 172–188.

Young, J. E. (1982). Loneliness, depression, and cognitive therapy: theory and application. In L. A. Peplau & D. Perlman (Eds.), *Loneliness* (pp. 379–405). New York: Wiley.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*, 30–41.