



A Longitudinal Study on the Mediating Role of Self-Esteem and Life Satisfaction in the Effect of Family Support on Loneliness in Adolescents.

This thesis has been written as a study assignment under the supervision of a Utrecht University teacher. Ethical permission has been granted for this thesis project by the ethics board of the Faculty of Social and Behavioral Sciences, Utrecht University, and the thesis has been assessed by two university teachers. However, the thesis has not undergone a thorough peer-review process so conclusions and findings should be read as such.

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Abstract

Although some studies investigated the relation between family support, self-esteem, life satisfaction and loneliness, little is known about the causal relation between family support and loneliness, mediated by self-esteem and life satisfaction. The present longitudinal study used data from Wave 2 and Wave 3 from the Youth Got Talent (YGT) study collected in the Netherlands. The sample included 939 adolescents aged between 16 and 24 years old ($M = 17.7$, $SD = 1.57$) who filled out a questionnaire in spring 2020 and fall 2020. Linear regressions showed, contrary to our hypothesis, that family support did not predict less loneliness. Additionally, we found that family support did not predict higher levels of self-esteem and life satisfaction. However, we still found that self-esteem and life satisfaction predicted lower levels of loneliness. For implications, this means that both life satisfaction and self-esteem could play a bigger role in interventions for preventing loneliness.

Keywords: adolescents, loneliness, family support, self-esteem, life satisfaction

Samenvatting

Hoewel sommige onderzoeken de relatie tussen steun van het gezin, zelfrespect, tevredenheid met het leven en eenzaamheid hebben onderzocht, is er weinig bekend over de oorzakelijke relatie tussen steun van het gezin en eenzaamheid, gemedieerd door zelfrespect en tevredenheid met het leven. De huidige longitudinale studie gebruikte gegevens van Wave 2 en Wave 3 van de Youth Got Talent (YGT) studie, verzameld in Nederland. De steekproef omvatte 939 adolescenten tussen 16 en 24 jaar oud ($M = 17,7$, $SD = 1,57$) die in het voorjaar van 2020 en het najaar van 2020 een vragenlijst invulden. Lineaire regressies toonden, in tegenstelling tot onze hypothese aan, dat steun van het gezin niet minder eenzaamheid voorspelde. Bovendien vonden we dat steun van het gezin geen hogere niveaus van zelfrespect en tevredenheid met het leven voorspelde. We ontdekten echter nog steeds dat zelfrespect en tevredenheid met het leven lagere niveaus van eenzaamheid voorspelden. Wat de implicaties betreft, betekent dit dat zowel tevredenheid met het leven als zelfrespect een grotere rol zouden kunnen spelen bij interventies die eenzaamheid proberen te voorkomen.

Kernwoorden: adolescenten, eenzaamheid, familiesteun, zelfvertrouwen, levensvoldoening

Introduction

Loneliness is a growing problem among adolescents in the Netherlands. In 2021, 14 percent of Dutch adolescents between 15 and 25 years old said that they experienced strong emotional loneliness, while in 2019 it was still 8 percent (Centraal Bureau voor de Statistiek [CBS], 2022). Loneliness in adolescence can be defined as a negative emotional response to a discrepancy between the desired and actual social network of the adolescent (Peplau & Perlman, 1982). The feeling of loneliness is a problem because it has a negative impact on adolescent's wellbeing. For example, loneliness was related to lower self-esteem (Bekhet et al., 2008) and associated with several mental health problems (Cooper et al., 2021; Bekhet et al., 2008). On the contrary, family support (Hawkley & Kocherginsky, 2018), life satisfaction (Salimi, 2011), and self-esteem (Hawkley & Cacioppo, 2010) were shown to be a protective factor for experiencing less loneliness. Family support plays a crucial role in the social network of an adolescent (Steinberg & Morris, 2001), as positive family relationships can provide emotional support, emotional support, companionship, and a sense of belonging, which can buffer against loneliness. Given the aforementioned detrimental effects of loneliness on adolescent's wellbeing, and the given protective factors for loneliness, it is important to examine if these protective factors could also explain increasing loneliness among adolescents in the Netherlands. That is why the present study focused on family support as a protective factor in the social network against loneliness, with self-esteem and life satisfaction as mediators.

Family support and loneliness

Family support requires protecting the adolescent against harm, but even more to support an adolescent's development. Furthermore, family support requires a clear focus from parents on the well-being (Dolan et al., 2006) and coping strategies of the adolescent (Gilligan, 2000) with problems like loneliness. If the adolescent receives support from the family, it works on the one hand as a protective factor against loneliness (Ainsworth, 1979; Bowlby, 1969) and on the other hand, it positively contributes to adolescents' psychological well-being to prevent loneliness (Parker & Benson, 2004). According to Bowlby (1973) parent-child relationships are even important for the rest of the live of the adolescent, because it is attached to adolescents' psychological health and prevents loneliness.

A theory that is about the importance of connection with other people to prevent loneliness, is the Need-to-Belong Theory of Baumeister and Leary (1995). According to this theory, everyone feels a strong motivation to connect with at least a few others. If adolescents miss these connections with their family this would result into several negative behavioral and

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mental outcomes (Baumeister & Leary, 1995). According to Parker and Benson (2004), more parental support contributes to an adolescent's schema that provides a basis for action and interpretation in relationships with peers.

Additionally, empirical evidence supports the relation between family support and loneliness by saying that adolescents with more parental support seem to be less lonely. A cross-sectional study among 756 Turkish students found that family support had a significant negative correlation with loneliness (Uruk & Demir, 2003). Also Zhang and Dong (2022) found in a meta-analysis which analysed studies among adolescents, adults and older adults on the relations between social support and loneliness that perceived social support of family had a significant effect on reducing loneliness.

Family support, self-esteem, and loneliness

Support from family plays an important role in development of adolescents self-esteem. Self-esteem is defined as the evaluation adolescents make to value themselves (King, 1997). High-quality parent-child support relationships are strongly linked to positive changes in self-esteem. Adolescents who experience much family support are namely more likely to perceive themselves as competent and valuable, because they experience emotional support, opportunities for growth and autonomy, acceptance and unconditional love (Thompson, 2016).

From empirical evidence it becomes clear that higher quality of parental attachment was associated with greater self-esteem in a cross-sectional study among 406 Turkish students (Karababa, 2022). We mention this evidence because we see a link between parental attachment and family support, because both parental attachment and family support are related to responsiveness to the needs of the adolescent (Kenny, 1987).

In addition, an increasing body of evidence has documented that low self-esteem is an important antecedent of loneliness during adolescence (Peplau et al., 1982). According to the loneliness theory from Weiss (1973) low self-esteem leaves individuals vulnerable to loneliness by leading to a lack of skills or motivation that could prevent the formation of satisfying social relations. Brennan's theoretical perspective relating to loneliness, which is congruent with Weiss's argument, suggests that certain personality characteristics, such as low self-esteem, may set the stage for adolescent loneliness. Peplau et al. (1982) have mentioned that individuals having low self-esteem raises individuals' feelings of loneliness. In reverse adolescents with higher self-esteem would be less reserved in seeking new satisfying social relationships, and therefore are less likely to feel lonely.

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Furthermore, several empirical studies found evidence for low self-esteem as a predictor for loneliness (Karababa, 2022; Vanhalst et al., 2013). Karababa's study (2022) also found that self-esteem was partially a mediator between family support and loneliness. More specifically said: lower family support led to lower self-esteem and lower self-esteem led to more loneliness. Lastly, Bekhet et al. (2008) and Vanhalst et al. (2013) also confirmed in a longitudinal study low self-esteem seems to be a predictor for subsequent loneliness. A meta-analysis study on 95 studies was conducted to explore predictors of loneliness among adolescents which showed that low self-esteem had a large effect size on loneliness (Mahon et al., 2006).

Family support, life satisfaction, and loneliness

Family support contributes to a higher satisfaction with life. It involves a positive attitude towards one's life rather than a negative attitude (Gilman & Huebner, 2003). According to the Need-to-belong-theory (Baumeister & Leary, 1995) people need to be connected with other people, otherwise they get emotionally psychologically harmed. If people succeed in belonging to other people their need is satisfied and they tend to be more satisfied with their lives (Mellor et al., 2008). If adolescents experience much family support, we expect the adolescents will also experience more satisfaction in life because of the responsiveness of the family to the adolescent's personal needs.

Family support was correlated with life satisfaction in a mixed-methods study among 266 Mexican American adolescents about perceived family support and life satisfaction (Edwards & Lopez, 2006). Schimmack et al. (2002) found in a cross-sectional study that in a sample with 651 participants, college students frequently and consistently used information about their relationships with their family when evaluating their lives in a life satisfaction questionnaire. This means that students view relationships with their families as contributing to their life satisfaction.

Furthermore, the more satisfied adolescents are with their lives, the less likely they are to experience loneliness. From theoretical evidence only the reverse relation between loneliness and life satisfaction became clear (Heinrich & Gullone, 2006). Therefore we came up with our own explanation. If adolescents are satisfied with their lives they could be viewed as rather happy persons. Therefore more people would like to connect with them and when adolescents are connected to more people, the chances are lower that they will feel lonely.

Fortunately, there was some empirical evidence to be added to this theoretical framework that the more satisfied adolescents were with their lives, the less they tended to experience loneliness (Ozben, 2013; Tmkaya et al., 2008; Andrew & Meeks, 2018).

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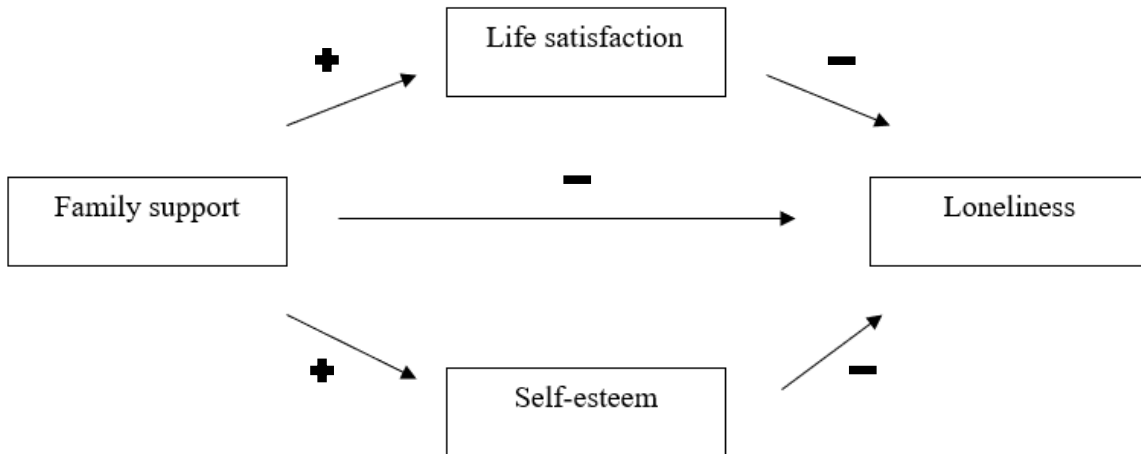
Akhunlaar (2010) found that medical students did not feel lonely when they felt satisfied with their lives, because they wanted to interact with people while satisfied with life. In line with this, Soysal (2016) found that adolescents who experienced lower life satisfaction also experienced more loneliness.

The current study

This current research especially contributed to the literature about the relation between family support and loneliness, mediated by self-esteem and life satisfaction. While in other countries few studies have been done on the topic of family support and loneliness in adolescents, in the Netherlands there are still very little. Additionally we found no studies which researched the complete relation between family support and loneliness, mediated by self-esteem and life satisfaction among adolescents, like we studied. Furthermore most of the studies which investigated some of the topics we investigated, did cross-sectional research. As our study will be longitudinal, we would be more able to find causal relations in our findings and hope to fill this gap in literature with this study. Specifically, we posed the following three research questions: (1) What is the direct impact of family support at T1 on loneliness at T2? (2) Is the relation between family support (T1) and loneliness (T2) mediated by self-esteem (T2)? (3) Is the relation between family support and loneliness mediated by life satisfaction? Based on existing theory and empirical studies, we hypothesized that more family support would lead to less loneliness. In addition, we hypothesized that more family support would lead to more self-esteem and more self-esteem would lead to less loneliness. Finally, we hypothesized that more family support would lead to more life satisfaction, and more life satisfaction would lead to less loneliness (see Figure 1).

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Figure 1 *Theoretical model for the relation between family support and loneliness, mediated by life satisfaction and self-esteem*



Method

Participants and procedures

The study was conducted by using data from a longitudinal project among adolescents (16+) called YOUth Got Talent (YGT). Data were used from Wave 2 (Spring 2020) and 3 (Fall 2020) out of four waves. The data were collected from adolescents at MBO schools (vocational educational track) in the Utrecht region of the Netherlands. The participants of the study were recruited by using convenient sampling. The participants of Wave 2 ($n = 939$) consisted of 60.3% females and 39.7% males. The participants were aged between 16 and 24 years ($M = 17.7$, $SD = 1.57$). The participants of Wave 3 consisted of 939 adolescents (56.9% females, 39.7% males and 1.8% who identified themselves as 'other'). On Wave 2 and 3 respectively 127 and 368 participants did not answer the question on gender. The participants were aged between 16 and 24 ($M = 18$, $SD = 1.34$). Missing's age Wave 2 and 3: 131 and 369. SES, ethnical background and educational levels were only filled out by some participants ($\pm 15\%$), so we decided not to add these descriptives to the sample descriptives.

The researchers from YOUth Got Talent received permission from the school principals and the participants gave active consent and were informed that their data would be anonymised. Ethical approval was gained from the Ethics Assessment Committee of the Faculty of Social Sciences at Utrecht University (FETC18-070) in 2018 and 2021.

The second wave of data was collected during the stage of the COVID-19 pandemic. MBO schools in the Netherlands were conducting online education, so researchers were present in the 'virtual classroom'. From all three participating schools together, 19 classes dropped out of the study because teachers chose not to continue participation.

In the third wave, schooling mostly remained online, but a few classes were present in physical classrooms. One school and 3 classes of another school dropped out of the study because teachers chose not to continue participation. Participants were allowed on withdrawing from the current study at any time.

Measurements

Loneliness

Loneliness was measured with the revised UCLA Loneliness Scale (Russell et al., 1980) from which we used 10 items on a 5-point Likert scale (1 = 'not at all true' to 5 = 'I always feel this way'). Higher mean scores indicated a higher level of loneliness. An example item (see Appendix A for the whole questionnaire) was: "I am unhappy being so withdrawn."

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As the scale consisted of negatively worded items and positively worded items, several items have been reversed to ensure all items reflected the same score. Cronbach's alpha of the scale was .889 for this study. This scale has been validated as highly reliable in literature (Knight et al., 1988)

Family support

Family support was measured with The Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) with four items with a 1-7 Likert scale (1 = 'Totally disagree' to 7 = 'Totally agree'). An example of an item (see Appendix A for the whole questionnaire) was: "My family really tries to help me." Higher mean scores meant higher levels of family support. Cronbach's alpha of the scale was found to be .924 for this study. The subscale family support has been validated as reliable in previous work (Kazarian & McCabe, 1991).

Life satisfaction

Life satisfaction was measured with the adapted version of Cantril Ladder (Cantril, 1965; Levin & Currie, 2014) which existed of single-item measure that asked: 'How satisfied are you with your life?' Respondents rated their subjective feelings on a 0-10 Likert scale with 0 being the worst life adolescents could imagine and 10 having the best life adolescents could imagine. Self-reported satisfaction with life has been found to have a high test-retest reliability in longitudinal studies (Krueger and Schkade, 2008). Even though life satisfaction could be measured with multiple statements, a single-item measure produces results similar to those achieved with longer scales (Cheung and Lucas, 2014).

Self-esteem

Self-esteem was measured with the Single-Item Self-Esteem Scale (Robins et al., 2001) with the question: 'I have high self-esteem'. This scale existed of a 1-7 point scale with 1 being the least self-esteem and 7 being the most self-esteem adolescents might have. The Single-Item Self-Esteem Scale showed a very high convergent validity with the complete Rosenberg Self-Esteem Scale in three studies using adult samples for a 5-point as well as a 7-point scale (Robins et al., 2001). Furthermore, the Single-Item Self-Esteem Scale had a nearly identical pattern of correlates with a wide range of criterion variables, such as self-evaluative biases (Robins et al., 2001). Therefore, the Single-Item Self-Esteem Scale was found to be a useful alternative to the Rosenberg Self-Esteem Scale in our research context.

Data-analysis

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The data of the present study were analysed by the program IBM SPSS 28.0. First, 631 participants who did not participate in Wave 2 or 3 were excluded. Then, 16 participants who were older than 24 in Wave 2 or 3 were excluded, as this research is about adolescents and we found in literature that this age corresponds with adolescents final growth to adulthood (Sawyer et al., 2018). Furthermore, 16 more participants were excluded from the original dataset, because they missed all data on all the four scales we were interested in (loneliness, family support, self-esteem and life satisfaction). After that, items 1, 5, 6, 9, 10 for loneliness were reversed in both Wave 2 and 3 and mean scores were computed on both the loneliness scale and the Family support scale. Additionally, we checked our data for unreliable answer patterns, which resulted in excluding one more participant. After that, descriptive statistics (skewness, kurtosis,) were examined, which was followed by the conducting of different multiple linear regressions. Several assumptions needed to be met for multiple linear regression. In the first place, we conducted a factor-analysis on the loneliness scale and the family support scale. On the loneliness scale we found two factors but regarding the remarkable high Eigenvalue (5) of the first factor, compared to the Eigenvalue of the second factor (1) we decided to just leave it with one factor. A Shapiro Wilks test showed that normality was not met in family support and loneliness, which meant that this assumption was violated. However, we decided that we would still continue our research, as we found it logical that there is not much loneliness or little family support among adolescents. When we checked for outliers with scatter charts, we decided to delete one outlier because it skewed our data on loneliness and family support too much. Linearity and homoscedasticity were checked by using scatter plots, and these assumptions were more or less met. Furthermore, after we checked correlations between all variables of interest we decided to control for age as a confounder in our research. we decided to control for age as a confounders in our mediation analyses. To test mediator effects of self-esteem and life satisfaction, the three steps for mediation of Baron and Kenny (1986) were used. That means that first, the mediator was regressed on the independent variable; second, the dependent variable was regressed on the independent variable; and third, the dependent variable was regressed on both the independent variable and on the mediator. Therefore, the effect of family support (T1) on self-esteem (T2) was tested. Additionally, the direct effect from family support (T1) on loneliness (T2) was tested with a linear regression, and controlled for loneliness (T1). Then, the effect family support (T1) on loneliness (T2) was tested, controlled for self-esteem (T2). Finally, we did exactly the same steps for the other mediator life satisfaction (T2).

Results

Descriptive results

Descriptive data for all research variables are given in Table 1. In general, family support, self-esteem, life satisfaction and loneliness were all quite stable over time. Life satisfaction showed the biggest difference in means over time (see Table 1).

Table 1
Descriptive Statistics of Research Variables

	<i>n</i> (%)	<i>M</i> (<i>SD</i>)	Min	Max
Gender (boys)	318(39.5%)			
Age T1		17.7(1.57)	16	24
Family Support T1		5.6(1.38)	1	7
Family Support T2		5.6(1.37)	1	7
Self-Esteem T1		4.6(1.39)	1	7
Self-Esteem T2		4.6(1.40)	1	7
Life Satisfaction T1		6.9(1.43)	0	10
Life Satisfaction T2		6.7(1.48)	1	10
Loneliness T1		1.9(0.65)	1	4.6
Loneliness T2		1.9(0.63)	1	4.1

Note. *n* = number of participants; *M* = mean; *SD* = standard deviation.

Correlations

Table 2 presents the correlations between all variables of interest. Family support was significantly negatively correlated with loneliness and significantly positively correlated with both self-esteem and life satisfaction. In addition self-esteem and life satisfaction were both negatively correlated with loneliness. Furthermore age was significantly correlated with loneliness. Therefore we decided to check whether age was a possible confounder for the relation between family support, self-esteem, life satisfaction and loneliness.

Table 2

Correlation Matrix of Demographic Variables, Loneliness, Family Support, Self-Esteem, and Life Satisfaction

Variable	1	2	3	4	5	6	7	8	9
1. Loneliness T1	-								
2. Loneliness T2	.74**	-							

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3. Family Support T1	-.51**	-.41**	-						
4. Family Support T2	-.43**	-.45**	.76**	-					
5. Self-Esteem T1	-.40**	-.37**	.26**	.23**	-				
6. Self-Esteem T2	-.44**	-.48**	.24**	.25**	.69**	-			
7. Life Satisfaction T1	-.51**	-.42**	.46**	.47**	.48**	.43**	-		
8. Life Satisfaction T2	-.49**	-.53**	.38**	.39**	.40**	.51**	.62**	-	
9. Gender	-.08*	-.06	.02	.09	.24**	.20**	.11**	.12*	-
10. Age	.05	.14**	-.05	-.08	.07	.02	-.06	-.07*	.02

Note. Spearman correlation was used for ordinal and continuous variables. Pearson Correlation was used for dichotomous variables.

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

Mediation analyses

Direct effect of family support on loneliness

First, we describe the direct effect of family support at T1 on loneliness at T2, controlled for age and loneliness T1. As shown in Table 3 and 4, results showed that family support did not significantly predict future loneliness: 95% CI [-0.05, 0.02]. This meant that there could not be a mediation effect at all. Practically, it meant that adolescent who reported high family support at T1, did not report less loneliness six months later. Instead loneliness at T1 predicted loneliness at T2 significantly: 95% CI [0.64, 0.80]. As shown in Table 3 and 4, this effect was positive, which meant that adolescent who felt lonely at T1, also felt lonely at T2.

Indirect effect of family support on loneliness via self-esteem

Because the direct relation between family support T1 and loneliness T2 was not significant, there could be no question of an mediation effect. However, we still completed the mediation to see if there could be some significant effects in the other steps. Therefore, first the effect of family support T1 on de mediator self-esteem T2 was tested. It was controlled for self-esteem T1 and age. Results showed that Family support at T1 did not significantly predict self-esteem, while controlling for self-esteem T1 and age: 95% CI [0.00, 0.19] (see Table 3). Instead self-esteem at T1 positively predicted self-esteem at T2: 95% CI [0.54, 0.73].

After that we tested the effect of self-esteem T2 on Loneliness T2. It became clear that self-esteem T2 had a significant negative effect on loneliness T2. While controlling for loneliness T1, both self-esteem T2 and loneliness T1 predicted loneliness T2 significantly: *B*

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= .64, $SE = .04$, $\beta = .64$, $p < .001$, 95% CI [.57, .71]. Both self-esteem T2 and loneliness T1 explained 59% of loneliness in adolescents at T2.

Finally, the full mediation effect was tested, controlled for age and loneliness T1. The results are given in Table 3 and Figure 2. However we cannot say that there was a mediation effect, as the direct relation between family support T1 and loneliness T2 was not significant, we still found a negative significant effect between self-esteem T2 and loneliness T2: 95% CI [-0.14, -0.08]. This meant that adolescents who reported high self-esteem at T2, reported less loneliness at T2. We also found that loneliness T1 also predicted loneliness T2 significantly: 95% CI [-0.58, -0.70].

Table 3

Outcomes Mediation Analysis between Family Support and Loneliness with Self-Esteem as Mediator

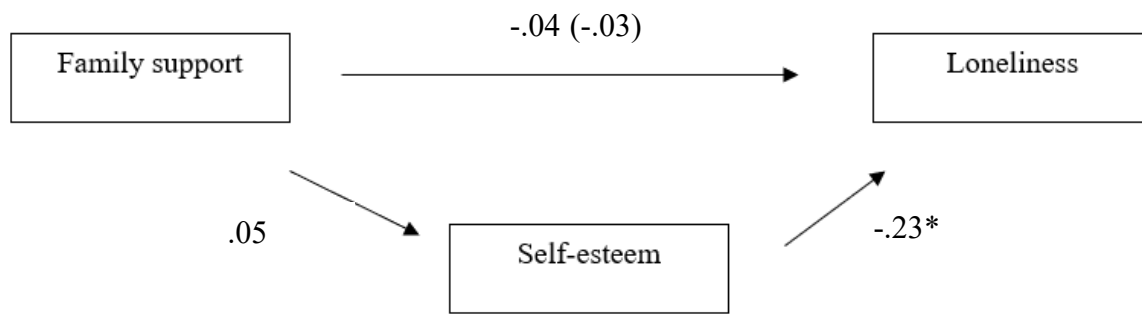
<i>Step 1 Results of Regression of Family Support T1 on Self-Esteem T2</i>						
	<i>B</i>	<i>SE</i>	β	<i>Sig.</i>	<i>R</i> ²	<i>F</i>
					.47	24.64
(Constant)	1.01	.67		.134		
Family Support T1	.05	.04	.05	.200		
Self-Esteem T1	.67	.04	.67	<.001**		
Age	.01	.04	.01	.732		
<i>Step 2 Results of Regression of Family Support T1 on Loneliness T2</i>						
	<i>B</i>	<i>SE</i>	β	<i>Sig.</i>	<i>R</i> ²	<i>F</i>
					.55	248.60
(Constant)	.70	.16		<.001		
Family Support T1	-.02	.02	-.04	.291		
Loneliness T1	.72	.04	.72	<.001**		
Age	.06	.02	.12	.006		
<i>Step 3 Results of Regression of Family Support T1 on Loneliness T2 controlled for Self-Esteem T2 as Mediator</i>						
	<i>B</i>	<i>SE</i>	β	<i>Sig.</i>	<i>R</i> ²	<i>F</i>
					.60	147.09
(Constant)	.67	.31		.030		
Family Support T1	-.01	.02	-.03	.432		
Self-Esteem T2	-.11	.02	-.23	<.001**		
Loneliness T1	.62	.04	.62	<.001**		
Age	-.11	.02	.09	.007		

Note. β = standardized coefficient; SE = standard error.

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

Figure 2

Mediation Model for the Relation between Family Support and Loneliness, Mediated by Self-Esteem



* $p < .01$

Indirect effect of family support on loneliness via life satisfaction

When testing the effect of family support T1 on life satisfaction T2, controlled for life satisfaction T1, we found no significant effect of family support: 95% CI [0.00, 0.19]. Instead, as reported in Table 4, we found that life satisfaction T1 predicted life satisfaction significantly at T2: 95% CI [0.54, 0.73]. That is, adolescents who showed higher values of self-esteem at T2, showed also higher self-esteem six months later.

Then, we tested the effect of life satisfaction T2 on loneliness T2. We found a significant negative effect of life satisfaction at T2 on loneliness at T2, while controlling for loneliness T1 and age: $B = .63, SE = .04, \beta = .62; p < .001, 95\% \text{ CI } [0.55, 0.70]$. Together with loneliness T1, life satisfaction at T2 explained 59% of the variance in loneliness in adolescents.

Lastly, the full mediation model was tested, controlled for age. These results are given in Table 4 and Figure 3. However we cannot say that there was a mediation effect, as the direct relation between family support T1 and loneliness T2 was not significant, we still found a significant effect between life satisfaction T2 and loneliness T2: 95% CI [-0.13, -0.07]. This meant that adolescents who reported high life satisfaction at T1, reported less loneliness at T2. Additionally, loneliness T1 was also a significant predictor of loneliness 3 in this model: 95% CI [0.54, 0.70].

Table 4

Outcomes Mediation Analysis between Family Support and Loneliness with Life Satisfaction as Mediator

<i>Step 1 Results of Regression of Family Support T1 on Life Satisfaction T2</i>						
	<i>B</i>	<i>SE</i>	β	<i>Sig.</i>	R^2	<i>F</i>
(Constant)	2.27	.83		.006	.40	78.35
Family Support T1	.10	.05	.09	.042		

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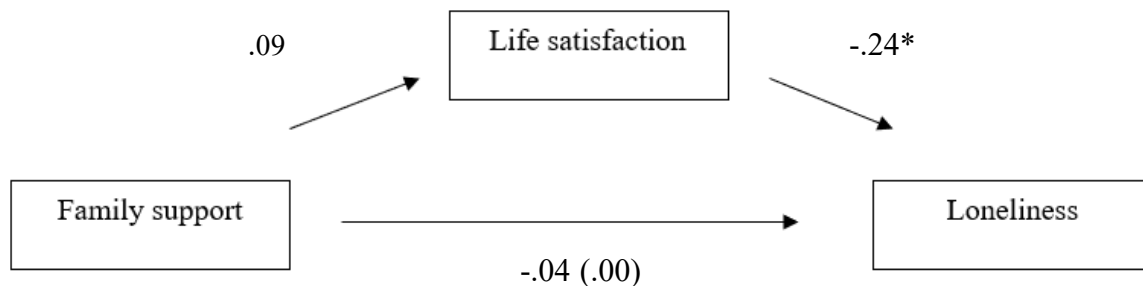
Life Satisfaction T1	.64	.05	.58	<.001**		
Age	-.03	.04	-.03	.459		
<i>Step 2 Results of Regression of Family Support T1 on Loneliness T2</i>						
	<i>B</i>	<i>SE</i>	β	<i>Sig.</i>	<i>R</i> ²	<i>F</i>
					.55	248.60
(Constant)	.70	.16		<.001		
Family Support T1	-.02	.02	-.04	.291		
Loneliness T1	.72	.04	.72	<.001**		
Age	.06	.02	.12	.006		
<i>Step 3 Results of Regression of Family Support T1 on Loneliness T2, controlled for Life Satisfaction</i>						
	<i>B</i>	<i>SE</i>	β	<i>Sig.</i>	<i>R</i> ²	<i>F</i>
					.60	146.29
(Constant)	.99	.33		.002		
Family Support T1	.00	.02	.00	.928		
Life Satisfaction T2	-.10	.02	-.24	<.001**		
Loneliness T1	.62	.04	.62	<.001**		
Age	.03	.02	.06	.066		

Note. β = standardized coefficient; *SE* = standard error.

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

Figure 3

Mediation Model for the Relation between Family Support and Loneliness, Mediated by Life Satisfaction



* $p < .01$

Discussion

The aim of this longitudinal study was to investigate whether family support predicted loneliness, mediated by self-esteem and life satisfaction. When we tested the effect of family support on loneliness, we controlled for loneliness at T1. Then, we found we found that only loneliness at T1 predicted loneliness in adolescents six months later. This is contrary to our expectation that family support would predict loneliness. Although the effects were not entirely as expected, we still found that both self-esteem and life satisfaction predicted loneliness in adolescents.

Contrary to hypothesis 1, our results did not show that adolescents who experienced family support did experience less loneliness six months later. What we found instead was

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that adolescents who felt already lonely at the first time measuring, also felt lonely six months later. As loneliness is a rather stable construct (Hawkley & Cacioppo, 2010), which means that loneliness would not change over time. Literature did mention the relation between family support and loneliness, but this was mainly research which used elderly people as sample (Roedel et al., 2011) instead of adolescents, which we were interested in. For adolescents, peers become more important as they grow older, while parents become less important (Cavanaugh & Buehler, 2016). That could explain why we did not find a significant effect of family support in the current study.

Contrary to hypothesis 2, more family support to adolescents did not lead to higher self-esteem. However, we did find that adolescents who scored higher on self-esteem did experience less loneliness. Some previous studies found that adolescents with high family support experienced more self-esteem (Karababa, 2022). The reason that we did not find a relation between family support and self-esteem, could be that self-esteem is affected by friends support instead (Ikiz & Cakar, 2010). Peer support namely, plays a role in shaping an individual's self-perception through social comparison processes (Chung et al., 2009).

Hypothesis 3 was partly confirmed, as we did not find that family support predicted more life satisfaction, but we did find that life satisfaction predicted less loneliness. This relation was also found in literature (Hawkley & Cacioppo, 2010)

Strengths and Limitations

A strength of this study is that the study contains longitudinal data, which gives the ability to draw more sure directional conclusions. So, we did not find that family support did lead to subsequent levels of loneliness six months later. Additionally, we used quite a large sample of students. Furthermore, students were from multiple study directions, which is representative for adolescents to all vocational tracks in the Netherlands. In addition to this, the vocational track has not been researched a lot yet, which is surprising because this is still the track with the most students (CBS, 2023). Therefore, the insights in this study were quite unique. However there were some limitations as well. One of the limitations was that our sample was not representative to all adolescents in the Netherlands and the world. Another limitation was that a lot of students did not fill out the questionnaires completely, so there were missing values on different scales. This could be due to the fact that it was quite a long questionnaire. This in combination with the fact that many students filled out the questionnaires online during a lockdown in corona time, could have led to a decrease in the concentration of the students and therefore missing values.

Conclusion and Implications

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In the current study we gained two main insights. The first is that we found out that adolescents who experience family support, did not experience more or less loneliness. The second is that self-esteem and life satisfaction did not play a role in the relation between family support and loneliness in adolescents. This does not mean however that the relation between family support and loneliness via self-esteem and life satisfaction is non-existent at all in reality. As our sample group was a very specific group in the Netherlands, there might be significant effects of family support on loneliness to be found in larger samples, with a bigger variety in educational levels. Yet, our research also offers some implications already for the design of interventions aimed at reducing adolescent loneliness. Since family support might not reduce loneliness in adolescents, it should no longer be necessary to invest in family based family based interventions. Rather should be focussed on intervention who stimulate life satisfaction in adolescents who feel lonely.

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Appendix A

Questions Loneliness Scale and Family Support Scale

Questions Loneliness Scale

1. Ik kan goed met anderen opschieten (I can find companionship when I want it).
2. Ik voel me alleen (I feel isolated from others).
3. Ik heb geen echte vrienden (All my social relationships are superficial.).
4. Ik voel me buitengesloten door de anderen (I feel left out).
5. Er zijn mensen met wie ik kan praten (There are people I can talk to).
6. Er zijn mensen die me echt begrijpen (There are people who really understand me).
7. Ik ben ongelukkig, omdat ik zo teruggetrokken ben (I am unhappy being so withdrawn).
8. People are around me but not with me (Zelfs wanneer ik in gezelschap ben voel ik me eenzaam).
9. Er zijn mensen die ik om hulp kan vragen (There are people who I can turn to).
10. Ik voel me sterk verbonden met mijn vrienden (I feel part of a group of friends).

Questions Family Support Scale

1. De mensen in mijn gezin doen echt hun best om mij te helpen (My family really tries to help me.).
2. Ik krijg thuis de emotionele steun en hulp die ik nodig heb. (I get the emotional help and support I need from my family).
3. Ik kan thuis over mijn problemen praten. (I can talk about my problems with my family).
4. Bij ons thuis willen ze me helpen om beslissingen te nemen. (My family is willing to help me make decisions).

Appendix B

Contract Data-Use TED Track

Utrecht, 2022

This letter constitutes formal confirmation of the fact that the data from the Utrecht University, Youth Studies Master, 2022-2023 have been made available to Arianne Arends of Utrecht University.

These data will not be made available to others, and the data may be used only for analysis and reporting on topics for the thesis, about which agreement has been reached with Marlies Maes.

Arianne Arends will receive access to the data from the dataset in order to answer the following research questions within the framework of the thesis:

1. Research question 1: What is the relation between family support and loneliness in adolescence?
2. Research question 2: Is the relation between family support and loneliness in adolescence mediated by life satisfaction?
3. Research question 3: Is the relation between family support and loneliness in adolescence mediated by self-esteem?

The following variables will be used:

Dependent variable: 'Loneliness', question number '7.3'.

Independent variables: 'Family support', question number '7.1'.

Other variables: 'Self-esteem', question number '5.5' and 'Life satisfaction', question number '5.6'.

No report based on the data from the project entitled 'YOUth Got Talent' will be made public, unless permission has been obtained in advance from the Project Coordinator for the 'YOUth Got Talent'.

After the expiration of this contract, dated 7 July, 2023, Arianne Arends

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shall delete the 'YOUth Got Talent' data.

Dates and signature:

27 January, 2023

A handwritten signature in black ink, appearing to read 'Arends', written over a horizontal line.

Name of student: Arianne Arends

Name of Project Coordinator:

Marlies Maes

Appendix C

Ethical Approval

P.O. Box 80140, 3508 TC Utrecht The Board of the Faculty of Social and Behavioural Sciences Utrecht University P.O. Box 80.140 3508 TC Utrecht		Faculty of Social and Behavioural Sciences Faculty Support Office Ethics Committee Visiting Address Padualaan 14 3584 CH Utrecht
Our Description Telephone E-mail Date Subject	23-1124 030 253 46 33 FETC-fsw@uu.nl 07 April 2023 Ethical approval	

ETHICAL APPROVAL

Study: The relation between family support and loneliness mediated by life satisfaction and self-esteem

Principal investigator: A.G. Arends

Supervisor: Marlies Maes

The study is approved by the Ethical Review Board of the Faculty of Social and Behavioural Sciences of Utrecht University. The approval is based on the documents sent by the researchers as requested in the form of the Ethics committee and filed under number 23-1124. The approval is valid through 07 July 2023. The approval of the Ethical Review Board concerns ethical aspects, as well as data management and privacy issues (including the GDPR). It should be noticed that any changes in the research design oblige a renewed review by the Ethical Review Board.

Yours sincerely,

Peter van der Heijden, Ph.D.

Chair

This is an automatically generated document, therefore it is not signed

Appendix D

Interdisciplinarity of my thesis topic

My thesis is about how family influences loneliness via self-esteem and life satisfaction. I needed concepts from different scientific disciplines to build my model. For example loneliness, self-esteem and life satisfaction are concepts from psychology. Family support is a term from which could be viewed as both social psychological and sociological. The psychological side would be more specifically a term from social psychology. But family support could also be linked to sociology. For example this discipline could raise the question: Which family structure would lead to the best family support for adolescents? Furthermore to what extent family support is practised, could also be bounded by cultural norms. For example in countries in which families play a bigger role in the life of an individual the relation between family support and life satisfaction could be stronger than in a culture where individualism is more supported.

As we study the relation between loneliness and family support, mediated by self-esteem and life satisfaction in adolescents, the whole research question could also be viewed from a pedagogical side. Pedagogy is mainly about teaching of children and adolescents, but it is also about the general development of children and adolescents. It is useful to use theoretical insights from these disciplines in particular because the main topic could be found in psychology, sociology and pedagogy disciplines and could offer a broader insight in important factors concerning loneliness.

Family support can be located in Sameroff's 'group'. Self-esteem as personality (person), life satisfaction as attitude (person) and loneliness in the first place as attitude (person) but I believe that it has also strong connections with group/family. These contexts build on each other in my model, because when the group or family is this case shows support to the individual, the individual will grow in personality and attitudes which will lead to less unsatisfied needs in terms of connection. This will lead to the fact that the individual feels more connected and is more connected with other people. Because these concepts build on each other in Sameroff's layers the model can be evaluated as interdisciplinary.

Appendix D

Syntax SPSS

* Encoding: UTF-8.

*Syntax Arianne Arends (6592295)

What is the relation between family support and loneliness mediated by self-esteem and life satisfaction?*

*First I removed 631 participants who did not participate in wave 2 or 3.

*Then I removed 16 participants who were older than 24 in wave 2 or 3.

Lastly I removed 16 participants who did not fill out scales on family support, loneliness, self-esteem and life satisfaction.

*Recode loneliness item 1, 5, 6, 9, 10 in wave 2 and 3.

DATASET ACTIVATE DataSet1.

RECODE SR02lonely1 SR02lonely5 SR02lonely6 SR02lonely9 SR02lonely10 SR03lonely1
SR03lonely5

SR03lonely6 SR03lonely9 SR03lonely10 (1=5) (2=4) (3=3) (4=2) (5=1) INTO
SR02lonely1_R SR02lonely5_R

SR02lonely6_R SR02lonely9_R SR02lonely10_R SR03lonely1_R SR03lonely5_R
SR03lonely6_R SR03lonely9_R

SR03lonely10_R.

EXECUTE.

*Frequencies geslacht wave 2 and 3.

FREQUENCIES VARIABLES=BG02sex BG03sex

/ORDER=ANALYSIS.

*Frequencies van age wave 2 and 3.

FREQUENCIES VARIABLES=BG02agey BG03agey

/STATISTICS=STDDEV MINIMUM MAXIMUM SEMEAN MEAN

/ORDER=ANALYSIS.

*Migration background wave 2 and 3. Only 14% filled out migration background, so I decided to not put this in my method.

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```
FREQUENCIES VARIABLES=BG02migc_dwn BG02migrc
```

```
/STATISTICS=STDDEV MINIMUM MAXIMUM SEMEAN MEAN
```

```
/ORDER=ANALYSIS.
```

```
OUTPUT MODIFY
```

```
/SELECT TABLES
```

```
/IF COMMANDS=["Frequencies(LAST)"] SUBTYPES="Frequencies"
```

```
/TABLECELLS SELECT=[VALIDPERCENT CUMULATIVEPERCENT]  
APPLYTO=COLUMN HIDE=YES
```

```
/TABLECELLS SELECT=[TOTAL] SELECTCONDITION=PARENT(VALID MISSING)  
APPLYTO=ROW HIDE=YES
```

```
/TABLECELLS SELECT=[VALID] APPLYTO=ROWHEADER UNGROUP=YES
```

```
/TABLECELLS SELECT=[PERCENT] SELECTDIMENSION=COLUMNS  
FORMAT="PCT" APPLYTO=COLUMN
```

```
/TABLECELLS SELECT=[COUNT] APPLYTO=COLUMNHEADER REPLACE="N"
```

```
/TABLECELLS SELECT=[PERCENT] APPLYTO=COLUMNHEADER REPLACE="%%".
```

*Which education level are you following right now? Only 15% filled this out, so I decided not to put this in my method.

```
DATASET ACTIVATE DataSet1.
```

```
FREQUENCIES VARIABLES=BG02edulev BG03edulev
```

```
/ORDER=ANALYSIS.
```

*Family affluence. Only 15% filled it out so I will not mention this in my method section.

```
FREQUENCIES VARIABLES= HF02fas1 HF02fas2 HF02fas3 HF02fas4 HF02fas5  
HF02fas6
```

```
/STATISTICS=STDDEV MEAN
```

```
/ORDER=ANALYSIS.
```

*Unreliable data loneliness checken.

```
FREQUENCIES VARIABLES=SR02lonely1_R SR02lonely5_R SR02lonely6_R  
SR02lonely9_R SR02lonely10_R
```

```
SR03lonely1_R SR03lonely5_R SR03lonely6_R SR03lonely9_R SR03lonely10_R  
BG03edulev SR02lonely2
```

```
SR02lonely3 SR02lonely4 SR02lonely7 SR02lonely8 SR03lonely2 SR03lonely3  
SR03lonely4 SR03lonely7
```

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SR03lonely8

/STATISTICS=STDDEV MEAN

/ORDER=ANALYSIS.

*Deleted 1 participants who had an unreliable answer pattern (only score 1 at loneliness, while the questions are not all the same direction).

*Test Reliability familysupport.

RELIABILITY

/VARIABLES=SR02famsupp1 SR02famsupp2 SR02famsupp3 SR02famsupp4

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=SCALE

/SUMMARY=TOTAL.

*Test reliabilty Loneliness.

RELIABILITY

/VARIABLES=SR02lonely2 SR02lonely3 SR02lonely4 SR02lonely7 SR02lonely8
SR02lonely1_R

SR02lonely5_R SR02lonely6_R SR02lonely9_R SR02lonely10_R

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/STATISTICS=SCALE

/SUMMARY=TOTAL.

*Factor analysis family support. Only one factor was measured, which is good.

FACTOR

/VARIABLES SR02famsupp1 SR02famsupp2 SR02famsupp3 SR02famsupp4

/MISSING LISTWISE

/ANALYSIS SR02famsupp1 SR02famsupp2 SR02famsupp3 SR02famsupp4

/PRINT INITIAL KMO AIC EXTRACTION ROTATION

/FORMAT SORT BLANK(.25)

/PLOT EIGEN

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```
/CRITERIA MINEIGEN(1) ITERATE(25)
/EXTRACTION PC
/CRITERIA ITERATE(25)
/ROTATION VARIMAX
/SAVE REG(ALL)
/METHOD=CORRELATION.
```

*Factoranalysis loneliness. I found two factors, but because the scale obviously only measures loneliness and the upper Eigenvalue is 5, I decided to continue with one variable.

FACTOR

```
/VARIABLES SR02lonely2 SR02lonely3 SR02lonely4 SR02lonely7 SR02lonely8
SR02lonely1_R
SR02lonely5_R SR02lonely6_R SR02lonely9_R SR02lonely10_R
/MISSING LISTWISE
/ANALYSIS SR02lonely2 SR02lonely3 SR02lonely4 SR02lonely7 SR02lonely8
SR02lonely1_R SR02lonely5_R
SR02lonely6_R SR02lonely9_R SR02lonely10_R
/PRINT INITIAL KMO AIC EXTRACTION ROTATION
/FORMAT SORT BLANK(.25)
/PLOT EIGEN
/CRITERIA MINEIGEN(1) ITERATE(25)
/EXTRACTION PC
/CRITERIA ITERATE(25)
/ROTATION VARIMAX
/SAVE REG(ALL)
/METHOD=CORRELATION.
```

*Compute variable FAM_SUPPORT2.

```
DATASET ACTIVATE DataSet1.
```

```
COMPUTE
```

```
FAM_SUPPORT2=Mean.2(SR02famsupp1,SR02famsupp2,SR02famsupp3,SR02famsupp4).
```

```
EXECUTE.
```

*Compute variable FAM_SUPPORT3.

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COMPUTE

FAM_SUPPORT3=Mean.2(SR03famsupp1,SR03famsupp2,SR03famsupp3,SR03famsupp4).

EXECUTE.

*Compute variable LONELINESS2.

COMPUTE

LONELINESS2=Mean.2(SR02lonely2,SR02lonely3,SR02lonely4,SR02lonely7,SR02lonely8

,

SR02lonely1_R,SR02lonely5_R,SR02lonely6_R,SR02lonely9_R,SR02lonely10_R).

EXECUTE.

*Compute variable LONELINESS3.

COMPUTE

LONELINESS3=Mean.2(SR03lonely2,SR03lonely3,SR03lonely4,SR03lonely7,SR03lonely8

,

SR03lonely1_R,SR03lonely5_R,SR03lonely6_R,SR03lonely9_R,SR03lonely10_R).

EXECUTE.

*I deleted six more participants, because they did not fill out enough to have a mean scale on family support and loneliness in both waves.

*Checking normality of family support 2 and 3, LS 2 and 3, SE 2 and 3, loneliness 2 and 3.

DATASET ACTIVATE DataSet1.

FREQUENCIES VARIABLES=IN02selfest IN03selfest IN02lifesat IN03lifesat

FAM_SUPPORT2 FAM_SUPPORT3

LONELINESS2 LONELINESS3

/NTILES=4

/STATISTICS=STDDEV VARIANCE MINIMUM MAXIMUM SEMEAN MEAN
MEDIAN MODE SKEWNESS SESKEW KURTOSIS

SEKURT

/HISTOGRAM

/ORDER=ANALYSIS.

*LS and SE were normaly distributed. Loneliness and family support were not in both waves. However this is logic, because loneliness is a problem which is nog average and when most people experience fam. supp. this is good.

***Checking linearity by all factors.

LONELINESS IN ADOLESCENCE

* Chart Builder. Scatterplot between loneliness2 and family support 2. Lollypopshape with pop on the end, but not non-linear.

GGRAPH

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=FAM_SUPPORT2  
LONELINESS2 MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES SUBGROUP=NO.
```

BEGIN GPL

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: FAM_SUPPORT2=col(source(s), name("FAM_SUPPORT2"))
```

```
DATA: LONELINESS2=col(source(s), name("LONELINESS2"))
```

```
GUIDE: axis(dim(1), label("FAM_SUPPORT2"))
```

```
GUIDE: axis(dim(2), label("LONELINESS2"))
```

```
GUIDE: text.title(label("Scatter Plot of LONELINESS2 by FAM_SUPPORT2"))
```

```
ELEMENT: point(position(FAM_SUPPORT2*LONELINESS2))
```

END GPL.

* Chart Builder. Scatterplot between Lon.3 and FS 3. It is the shape of a lollypop with the pop on the end.

GGRAPH

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=FAM_SUPPORT3  
LONELINESS3 MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES SUBGROUP=NO.
```

BEGIN GPL

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: FAM_SUPPORT3=col(source(s), name("FAM_SUPPORT3"))
```

```
DATA: LONELINESS3=col(source(s), name("LONELINESS3"))
```

```
GUIDE: axis(dim(1), label("FAM_SUPPORT3"))
```

```
GUIDE: axis(dim(2), label("LONELINESS3"))
```

```
GUIDE: text.title(label("Scatter Plot of LONELINESS3 by FAM_SUPPORT3"))
```

```
ELEMENT: point(position(FAM_SUPPORT3*LONELINESS3))
```

LONELINESS IN ADOLESCENCE

END GPL.

*graph checken.

EXAMINE VARIABLES=FAM_SUPPORT2

/PLOT HISTOGRAM NPLOT

/STATISTICS DESCRIPTIVES

/CINTERVAL 95

/MISSING LISTWISE

/NOTOTAL.

* Chart Builder.FS2 op SE2.

GGRAPH

/GRAPHDATASET NAME="graphdataset" VARIABLES=FAM_SUPPORT2 IN02selfest
MISSING=LISTWISE

REPORTMISSING=NO

/GRAPHSPEC SOURCE=INLINE

/FITLINE TOTAL=YES.

BEGIN GPL

SOURCE: s=userSource(id("graphdataset"))

DATA: FAM_SUPPORT2=col(source(s), name("FAM_SUPPORT2"))

DATA: IN02selfest=col(source(s), name("IN02selfest"))

GUIDE: axis(dim(1), label("FAM_SUPPORT2"))

GUIDE: axis(dim(2), label("Ik heb veel zelfvertrouwen"))

GUIDE: text.title(label("Scatter Plot of Ik heb veel zelfvertrouwen by FAM_SUPPORT2"))

ELEMENT: point(position(FAM_SUPPORT2*IN02selfest))

END GPL.

*Kind 597 verwijderd. Outlier, die heel eenzaam was maar ook heel veel family support ontving. Belangrijk om bij stil te staan, maar wel verwijderd omdat dit kind mijn hele resultaten scheef trekt.

* Chart Builder. SE2 - L2.

GGRAPH

/GRAPHDATASET NAME="graphdataset" VARIABLES=IN02selfest LONELINESS2
MISSING=LISTWISE

LONELINESS IN ADOLESCENCE

```
REPORTMISSING=NO
/GRAPHSPEC SOURCE=INLINE
/FITLINE TOTAL=YES.
BEGIN GPL
SOURCE: s=userSource(id("graphdataset"))
DATA: IN02selfest=col(source(s), name("IN02selfest"))
DATA: LONELINESS2=col(source(s), name("LONELINESS2"))
GUIDE: axis(dim(1), label("Ik heb veel zelfvertrouwen"))
GUIDE: axis(dim(2), label("LONELINESS2"))
GUIDE: text.title(label("Scatter Plot of LONELINESS2 by Ik heb veel zelfvertrouwen"))
ELEMENT: point(position(IN02selfest*LONELINESS2))
END GPL.
```

* Chart Builder. FS2 - LS2.

```
GGRAPH
/GRAPHDATASET NAME="graphdataset" VARIABLES=FAM_SUPPORT2 IN02lifesat
MISSING=LISTWISE
REPORTMISSING=NO
/GRAPHSPEC SOURCE=INLINE
/FITLINE TOTAL=YES.
BEGIN GPL
SOURCE: s=userSource(id("graphdataset"))
DATA: FAM_SUPPORT2=col(source(s), name("FAM_SUPPORT2"))
DATA: IN02lifesat=col(source(s), name("IN02lifesat"))
GUIDE: axis(dim(1), label("FAM_SUPPORT2"))
GUIDE: axis(dim(2), label("Hoe voel jij je over je leven?"))
GUIDE: text.title(label("Scatter Plot of Hoe voel jij je over je leven? by
FAM_SUPPORT2"))
ELEMENT: point(position(FAM_SUPPORT2*IN02lifesat))
END GPL.
```

* Chart Builder. LS2-L2.

```
GGRAPH
```

LONELINESS IN ADOLESCENCE

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=IN02lifecat LONELINESS2  
MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES.
```

```
BEGIN GPL
```

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: IN02lifecat=col(source(s), name("IN02lifecat"))
```

```
DATA: LONELINESS2=col(source(s), name("LONELINESS2"))
```

```
GUIDE: axis(dim(1), label("Hoe voel jij je over je leven?"))
```

```
GUIDE: axis(dim(2), label("LONELINESS2"))
```

```
GUIDE: text.title(label("Scatter Plot of LONELINESS2 by Hoe voel jij je over je leven?"))
```

```
ELEMENT: point(position(IN02lifecat*LONELINESS2))
```

```
END GPL.
```

```
* Chart Builder. FS3-SE3.
```

```
GGRAPH
```

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=FAM_SUPPORT3 IN03selfest  
MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES.
```

```
BEGIN GPL
```

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: FAM_SUPPORT3=col(source(s), name("FAM_SUPPORT3"))
```

```
DATA: IN03selfest=col(source(s), name("IN03selfest"))
```

```
GUIDE: axis(dim(1), label("FAM_SUPPORT3"))
```

```
GUIDE: axis(dim(2), label("Ik heb veel zelfvertrouwen"))
```

```
GUIDE: text.title(label("Scatter Plot of Ik heb veel zelfvertrouwen by FAM_SUPPORT3"))
```

```
ELEMENT: point(position(FAM_SUPPORT3*IN03selfest))
```

```
END GPL.
```

```
* Chart Builder. SE3-L3.
```

```
GGRAPH
```

LONELINESS IN ADOLESCENCE

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=IN03selfest LONELINESS3  
MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES.
```

```
BEGIN GPL
```

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: IN03selfest=col(source(s), name("IN03selfest"))
```

```
DATA: LONELINESS3=col(source(s), name("LONELINESS3"))
```

```
GUIDE: axis(dim(1), label("Ik heb veel zelfvertrouwen"))
```

```
GUIDE: axis(dim(2), label("LONELINESS3"))
```

```
GUIDE: text.title(label("Scatter Plot of LONELINESS3 by Ik heb veel zelfvertrouwen"))
```

```
ELEMENT: point(position(IN03selfest*LONELINESS3))
```

```
END GPL.
```

* Chart Builder. FS3-LS3.

```
GGRAPH
```

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=FAM_SUPPORT3 IN03lifesat  
MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES.
```

```
BEGIN GPL
```

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: FAM_SUPPORT3=col(source(s), name("FAM_SUPPORT3"))
```

```
DATA: IN03lifesat=col(source(s), name("IN03lifesat"))
```

```
GUIDE: axis(dim(1), label("FAM_SUPPORT3"))
```

```
GUIDE: axis(dim(2), label("Hoe voel jij je over je leven?"))
```

```
GUIDE: text.title(label("Scatter Plot of Hoe voel jij je over je leven? by  
FAM_SUPPORT3"))
```

```
ELEMENT: point(position(FAM_SUPPORT3*IN03lifesat))
```

```
END GPL.
```

LONELINESS IN ADOLESCENCE

* Chart Builder. LS3-L3.

GGRAPH

```
/GRAPHDATASET NAME="graphdataset" VARIABLES=IN03lifusat LONELINESS3  
MISSING=LISTWISE
```

```
REPORTMISSING=NO
```

```
/GRAPHSPEC SOURCE=INLINE
```

```
/FITLINE TOTAL=YES.
```

BEGIN GPL

```
SOURCE: s=userSource(id("graphdataset"))
```

```
DATA: IN03lifusat=col(source(s), name("IN03lifusat"))
```

```
DATA: LONELINESS3=col(source(s), name("LONELINESS3"))
```

```
GUIDE: axis(dim(1), label("Hoe voel jij je over je leven?"))
```

```
GUIDE: axis(dim(2), label("LONELINESS3"))
```

```
GUIDE: text.title(label("Scatter Plot of LONELINESS3 by Hoe voel jij je over je leven?"))
```

```
ELEMENT: point(position(IN03lifusat*LONELINESS3))
```

END GPL.

*Regressie opnieuw zonder outlier. Looks good, normaly distributed.

REGRESSION

```
/MISSING LISTWISE
```

```
/STATISTICS COEFF OUTS R ANOVA
```

```
/CRITERIA=PIN(.05) POUT(.10)
```

```
/NOORIGIN
```

```
/DEPENDENT LONELINESS2
```

```
/METHOD=ENTER FAM_SUPPORT2
```

```
/SCATTERPLOT=(*ZPRED ,*ZRESID)
```

```
/RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
```

```
/CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

*Correlatie checken Fam Support 1 en 2.

```
DATASET ACTIVATE DataSet1.
```

CORRELATIONS

LONELINESS IN ADOLESCENCE

```
/VARIABLES=FAM_SUPPORT2 FAM_SUPPORT3  
/PRINT=TWOTAIL NOSIG FULL  
/STATISTICS DESCRIPTIVES  
/MISSING=PAIRWISE.
```

*Checking all correlations in wave 2. The factors family support, loneliness, self-esteem and life satisfaction are all significantly related and correlated in the direction of the hypothesis.

CORRELATIONS

```
/VARIABLES=FAM_SUPPORT2 LONELINESS2 IN02selfest IN02lifesat  
/PRINT=TWOTAIL NOSIG FULL  
/STATISTICS DESCRIPTIVES  
/MISSING=PAIRWISE.
```

*Checking all correlations in wave 3. The factors family support, loneliness, self-esteem and life satisfaction are all significantly related and correlated in the direction of the hypothesis.

CORRELATIONS

```
/VARIABLES=FAM_SUPPORT3 LONELINESS3 IN03selfest IN03lifesat  
/PRINT=TWOTAIL NOSIG FULL  
/STATISTICS DESCRIPTIVES  
/MISSING=PAIRWISE.
```

*Checking correlation loneliness2 and 3. Loneliness 2 and 3 are significantly related. Loneliness 3 is significantly higher than loneliness 2.

CORRELATIONS

```
/VARIABLES=LONELINESS3 LONELINESS2  
/PRINT=TWOTAIL NOSIG FULL  
/STATISTICS DESCRIPTIVES  
/MISSING=PAIRWISE.
```

*Correlations between my variables in wave 2 and age, sex, migration background, level, FAS. Sex is a significant correlation > need to check for confounder.

CORRELATIONS

```
/VARIABLES=LONELINESS2 FAM_SUPPORT2 IN02selfest IN02lifesat BG02sex  
BG02agey BG02edulev BG02migrc
```

LONELINESS IN ADOLESCENCE

HF02FAS

/PRINT=TWOTAIL NOSIG FULL

/STATISTICS DESCRIPTIVES

/MISSING=PAIRWISE.

NONPAR CORR

/VARIABLES=LONELINESS2 FAM_SUPPORT2 IN02selfest IN02lifesat BG02sex
BG02agey BG02edulev BG02migrc

HF02FAS

/PRINT=SPEARMAN TWOTAIL NOSIG FULL

/MISSING=PAIRWISE.

*Correlations between my variables in wave 3 and age, sex, migration background, level, FAS. Sex is a significant correlation > need to check for confounder.

CORRELATIONS

/VARIABLES=FAM_SUPPORT3 LONELINESS3 HF02FAS IN03selfest IN03lifesat
BG02migrc BG03agey BG03edulev

BG03sex

/PRINT=TWOTAIL NOSIG FULL

/STATISTICS DESCRIPTIVES

/MISSING=PAIRWISE.

NONPAR CORR

/VARIABLES=FAM_SUPPORT3 LONELINESS3 HF02FAS IN03selfest IN03lifesat
BG02migrc BG03agey BG03edulev

BG03sex

/PRINT=SPEARMAN TWOTAIL NOSIG FULL

/MISSING=PAIRWISE.

*Mediatie-analysis conducted, all mediations were significant, so partial mediation.

* Linear regression between family support2 and loneliness3. This relation is significant.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS CI(95) R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

LONELINESS IN ADOLESCENCE

```
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

*Linear regression between family support2 and life satisfaction3. Relation significant, although scatterplot shows slightly negative correlation and linearity is not perfect in P-P-plot.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT IN03lifesat  
/METHOD=ENTER FAM_SUPPORT2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

*Linear regression between life satisfaction3 and loneliness3. Relation significant, although high bar in the normality plot and scatterplot shows slightly negative correlation.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER IN03lifesat  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

*Linear regression between family support2 and self-esteem3. Relation significant, although not very normal, little bit weird P-P-plot, scatterplot shows slightly negative correlation.

REGRESSION

LONELINESS IN ADOLESCENCE

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT IN03selfest  
/METHOD=ENTER FAM_SUPPORT2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

*Linear regression between self-esteem3 and loneliness3. Significant relation, although not perfectly normal distributed and scatterplot shows a slightly parabola that opens upward.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER IN03selfest  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

*Total mediation effect. If I did this correctly this is also significant.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2 IN03lifesat IN03selfest  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

LONELINESS IN ADOLESCENCE

*Controlled for loneliness. Loneliness2 is a significant predictor while family support 2 is not significant anymore in model 2 with controll for loneliness2.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2 IN03lifesat IN03selfest  
/METHOD=ENTER LONELINESS2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)  
/SAVE PRED.
```

*Controlled for LS2. LS2 is not significant so LS2 is not another explanation for the significant relation in my original model.

DATASET ACTIVATE DataSet1.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2 IN03lifesat IN03selfest  
/METHOD=ENTER IN02lifesat  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Controlled for SE2. SE2 is also nog significant so SE2 is also not others explanation for the significant relation in my original model.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN
```

LONELINESS IN ADOLESCENCE

```
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2 IN03lifesat IN03selfest  
/METHOD=ENTER IN02selfest  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Controlled for Age3 because there was a significant correlation between age3 and loneliness3. Age is Sig. .004 so it is doubtful. It is not very significant. All the other relations are still significant.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2 IN03lifesat IN03selfest  
/METHOD=ENTER BG03agey  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Controlled for loneliness2 in relation between FS2 and L3.

DATASET ACTIVATE DataSet1.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2  
/METHOD=ENTER LONELINESS2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*L2 vs L3. Is also significant. Conclusion: youth who feel lonely in the second wave feel also lonely in the third wave.

REGRESSION

LONELINESS IN ADOLESCENCE

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER LONELINESS2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Controlling age3, relation FS2 ->L3. Age is not significant anymore.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER FAM_SUPPORT2  
/METHOD=ENTER BG03agey  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Step 3 mediator effect self-esteem 3 on loneliness3 controlled for family support2 (c'). Still significant.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER IN03selfest  
/METHOD=ENTER FAM_SUPPORT2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Step 3 mediator effect LS3 on L3 controlled for family support 2 (c'). Still significant.

LONELINESS IN ADOLESCENCE

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT LONELINESS3  
/METHOD=ENTER IN03lifesat  
/METHOD=ENTER FAM_SUPPORT2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Step 1 mediator effect FS2 on LS3 controlled vor L2. Fs2 on LS3 is still significant controlled for L2. Also L2 is significant, so L2 also has an effect on LS3.

DATASET ACTIVATE DataSet1.

REGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT IN03lifesat  
/METHOD=ENTER FAM_SUPPORT2  
/METHOD=ENTER LONELINESS2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)  
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Step 1 medREGRESSION

```
/MISSING LISTWISE  
/STATISTICS COEFF OUTS CI(95) R ANOVA  
/CRITERIA=PIN(.05) POUT(.10)  
/NOORIGIN  
/DEPENDENT IN03selfest  
/METHOD=ENTER FAM_SUPPORT2  
/METHOD=ENTER LONELINESS2  
/SCATTERPLOT=(*ZRESID ,*ZPRED)
```

LONELINESS IN ADOLESCENCE

/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).iator effect FS2 on SE3 controlled for L2. FS2-SE3 becomes fully explained by L2.

*Step 2 mediator effect SE3 on L3 controlled for L2. Both significant, so SE3 as well as L2 explain L3.

REGRESSION

```
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT LONELINESS3
/METHOD=ENTER IN03selfest
/METHOD=ENTER LONELINESS2
/SCATTERPLOT=(*ZRESID ,*ZPRED)
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Step 2 mediator effect LS3 on L3 controlled voor L2. Both L2 and LS3 explain L3 significantly.

REGRESSION

```
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT LONELINESS3
/METHOD=ENTER IN03lifesat
/METHOD=ENTER LONELINESS2
/SCATTERPLOT=(*ZRESID ,*ZPRED)
/RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

*Correlation table with all correlations from T1 and T2.

DATASET ACTIVATE DataSet1.

CORRELATIONS

```
/VARIABLES=BG02agey BG02sex IN02selfest IN03selfest IN02lifesat IN03lifesat
FAM_SUPPORT2
```

```
FAM_SUPPORT3 LONELINESS2 LONELINESS3
```

LONELINESS IN ADOLESCENCE

/PRINT=TWOTAIL NOSIG FULL

/MISSING=PAIRWISE.

*Regression family support on self-esteem, controlled for loneliness2 en age.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT IN03selfest

/METHOD=ENTER FAM_SUPPORT2

/METHOD=ENTER LONELINESS2 BG02agey.

*Regression family support on life satisfaction2, controlled for loneliness2 en age.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT IN03lifesat

/METHOD=ENTER FAM_SUPPORT2

/METHOD=ENTER LONELINESS2 BG02agey.

*Regression family support on loneliness3, controlled for self-esteem, loneliness2 en age.

REGRESSION

/MISSING LISTWISE

/STATISTICS COEFF OUTS CI(95) R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT LONELINESS3

/METHOD=ENTER FAM_SUPPORT2

/METHOD=ENTER LONELINESS2 BG02agey IN03selfest.

**Regression family support on loneliness3, controlled for life satisfaction, loneliness2 en age.

REGRESSION

LONELINESS IN ADOLESCENCE

/MISSING LISTWISE

/STATISTICS COEFF OUTS CI(95) R ANOVA

/CRITERIA=PIN(.05) POUT(.10)

/NOORIGIN

/DEPENDENT LONELINESS3

/METHOD=ENTER FAM_SUPPORT2

/METHOD=ENTER LONELINESS2 BG02agey IN03lifesat.

