Loneliness and the Role of Friendship in Youth: A Meta-Analysis

MASTERTHESIS YOUTH STUDIES

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Content

Abstract

High rates of loneliness in youth are of great concern. During this developmental phase, forming social relationships is crucial. Friendships can combat loneliness, even possibly long-term. However, interventions focusing on social relationships have not been highly successful. To improve the focus of these interventions, a better understanding of the relation between friendship and loneliness in youth is needed. This meta-analysis was conducted to synthesize the current data on this topic. A classical meta-analysis and two moderator analyses were conducted with 62 effect sizes, with a total sample of 18,666 individuals (47.7% male). Results showed a medium overall effect of $r = -.33$. This association with loneliness was stronger for quality of friendship than quantity of friendship. No interaction effect of aspect of friendship and age was found. These findings indicate that a) youth with lower quality and quantity of friendship feel lonelier, b) this relation is stronger when friendship is measured by quality of friendship rather than quantity of friendship, and c) that this is the same for both childhood and adolescent friendships. How these findings contribute to the current understanding of loneliness in youth, and suggestions for future research and interventions, will be discussed.

Samenvatting

Eenzaamheid onder de jeugd is van grote zorg. Gedurende deze ontwikkelingsfase is het vormen van sociale relaties cruciaal. Vriendschappen kunnen eenzaamheid tegengaan, mogelijk ook op lange termijn. Echter, interventies gefocust op sociale relaties zijn weinig succesvol gebleken. Om de focus van deze interventies te verbeteren, is er meer inzicht nodig in de relatie tussen vriendschap en eenzaamheid onder de jeugd. Deze meta-analyse is uitgevoerd om bestaande data van dit onderwerp samen te vatten. Een klassieke meta-analyse en twee moderator analyses zijn uitgevoerd met 62 effectgroottes, met een totale steekproef van 18,666 individuen (47.7% man). Resultaten lieten een algemeen middelgroot effect zien van $r = -.33$. Deze associatie met eenzaamheid was sterker voor kwaliteit van vriendschap dan voor kwantiteit van vriendschap. Er is geen interactie effect tussen aspect van vriendschap en leeftijd gevonden. Deze resultaten suggereren dat a) jeugd met lagere kwaliteit en kwantiteit van vriendschap zich eenzamer voelen, b) dat deze relatie sterker is wanneer vriendschap is gemeten met kwaliteit van vriendschap in vergelijking met kwantiteit van vriendschap, en c) dat dit gelijk is voor kinderen en jongeren. Hoe deze resultaten bijdragen aan het inzicht in eenzaamheid onder jeugd, en suggesties voor toekomstig onderzoek en interventies, wordt besproken.

<center>**Introduction**</center>

Loneliness in Youth

Students studying in small rooms, away from their parent's home with their digital screen as their only way of communicating: loneliness in adolescents is of growing concern in politics, especially since Covid-19. According to the Central Bureau of Statistics (2018), 10.1% of adolescents 15-25 years old reported severe social loneliness in 2018. Loneliness is defined as the negative emotional response to a perceived deficiency in either the quality or quantity of one's social relationships (Perlman & Peplau, 1981).

Although most people experience loneliness at some point in their lives, loneliness in youth is especially concerning (Qualter et al., 2015; Rockach & Neto, 2005). First of all, building social relationships is crucial during adolescence as a developmental phase. Social interaction increases autonomy and gives the chance to build relationships outside the family (Twenge et al., 2019). Secondly, loneliness is associated with a range of negative health consequences that impact adolescents' further development, including higher rates of depression, obesity, and suicide ideation (Goosby et al., 2013; Stravysnky & Boyer, 2001). The impact of loneliness in youth across the lifespan emphasizes the need for interventions specifically aimed at adolescents (de Jong-Gierveld et al., 2006).

One important factor that contributes to loneliness in youth is friendship (Qualter et al., 2015). Peer relationships become of great importance during adolescence and offer multiple benefits for social and emotional development (Bukowski et al., 1998; Poulin & Chan, 2010; Twenge et al., 2019). A perceived lack of those relationships can lead to feelings of loneliness (Perlman & Peplau, 1981). Successful friendships are of great importance for combating loneliness, since they can protect adolescents from feeling lonely during their youth (Renshaw & Brown, 1993). Since stable adolescent friendships can last during later phases in life, adolescent friendships can have a possible long-lasting positive effect on combating loneliness (Ledbetter & Griffin, 2007; Nicolaisen & Thorsen, 2017). This study focuses on better understanding the association between friendship and loneliness in youth.

Friendship and Loneliness

To combat loneliness in youth, interventions often focus on increasing social opportunities to establish friendships (Masi et al., 2011). Understandably, because a lack of friendships is at the core of the definition of loneliness (Perlman & Peplau, 1981). During adolescence, youth strive for friendships that give them understanding, self-disclosure, validity, and empathy (Parker & Asher, 1993). Friendships are important for promoting social development of adolescents: they offer social support and a context for learning social skills (Bukowski et al., 1998). They also play a key role in emotional development, as they provide emotional security, companionship, and intimacy (Poulin & Chan, 2010).

Interventions focusing on increasing social opportunities, for example for forming new friendships, have not proven to be highly effective (Masi et al., 2011). A better understanding of how friendship is associated with loneliness is needed to improve the focus of these interventions, to combat loneliness during adolescence, and possibly long-term (Ledbetter & Griffin, 2007; Nicolaisen & Thorsen, 2017). In this study, the association between loneliness and friendships in youth will be studied using a meta-analysis.

Quality and Quantity of Friendship

Friendships consist of two dimensions: friendship quality and friendship quantity (Nangle et al., 2003). The quality of friendship is defined by Parker and Asher (1993, p. 611) as 'the degree of companionship the relationship provides, its supportiveness and its level of conflict'. The quantity of friendships refers to the amount of friends and frequency of social contact one considers to have (Perlman & Peplau, 1981). Humans are in need of close emotional bonds, as well as a larger network of social contacts (Baumeister & Leary, 1995). Therefore, when number of friends or quality of friendship is low, adolescents are at risk for loneliness (Schwartz-Mette et al., 2020; Vanhalst et al., 2014).

Theory generally seems to support the popular claim that friendship quality is a more important aspect of friendship compared to quantity of friendship, for example by Weiss (1993). He argues that simply having a friend is not enough to fulfill relationship needs: the quality of that friendship plays an important role. Regarding empirical evidence, multiple studies show that a high quality of friendship positively affects someone's wellbeing. It can protect against the negative effects of adjustment problems, bullying and other negative stress sources in

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adolescents (Erwin, 1998; Malcolm et al., 2006; Waldrip et al., 2008). This leads to the popular claim that quality of friendship is a more important aspect of friendship compared to quantity of friendship. However, these studies do not focus on friendship in relation to loneliness or in comparison with quantity of friendship.

An empirical study that compares quality and quantity of friendship in relation to loneliness, is a meta-analysis by Schwartz-Mette et al. (2020). This study found a slightly larger association between loneliness and positive quality of friendship in comparison with the association between loneliness and number of friends. In contrast, the association between loneliness and negative quality of friendship was smaller. However, in the study of Schwartz-Mette et al. (2020), no conclusions were drawn about whether quality of friendship was more important than quantity of friendship. First, because it measures quality of friendship as a positive or negative friendship experience, not as a general aspect. Second, because the conclusions about the associations in comparison with number of friends, differ between positive and negative friendship quality. Because of a lack of studies that compare quality and quantity of friendship, this study will analyze whether the association between loneliness and friendship is different for quality of friendship and quantity of friendship.

Childhood versus Adolescent Friendships

The association between friendship and loneliness can also be better understood by differences between childhood and adolescent friendships. Loneliness is less common in children than in adolescents, according to Qualter et al. (2015). That study also argues that during childhood, quantity of friendship is more important than quality of friendship, but that there is a shift during adolescence to quality of friendship. This is based on how perspectives on friendship change during adolescence, for example because there is a larger focus on intimacy, stability and personal significance (Erwin, 1998; Qualter et al., 2015). During childhood, friendships can be temporary, are often formed easily and are less stable than adolescent friendships. Therefore, children may have a bigger quantity of friends, but lower quality of friendship than adolescents. From childhood to adolescence, the number of friendships decreases, but the friendships become more irreplaceable (Erwin, 1998). Concluding, the changing form and function of friendships can impact its association with loneliness. This study will research whether the association

between loneliness and quality or quantity of friendship is different for childhood friendships and adolescent friendships.

The Current Study

This study will answer the following research question: *How are friendship and loneliness in youth associated?* To fully understand the relation between friendship and loneliness, this study answers two additional research questions. The first sub-question is: *Is the association between loneliness and friendship different for quality of friendship and quantity of friendship?* The second sub-question is: *Is the association between loneliness and quality or quantity of friendship different for childhood friendships and adolescent friendships?* The following hypotheses will be tested using a meta-analysis (Figure 1):

H1: A higher friendship quantity and quality are negatively related to loneliness in adolescents.

H2: The relation between loneliness and quality of friendship is stronger than the relation between loneliness and friendship quantity.

H3: In adolescent friendships, the quality of friendship offers a more important explanation for the relation between loneliness and friendship than quantity of friendship.

H4: In childhood friendships, the quantity of friends offers a more important explanation for the relation between loneliness and friendship than quality of friendship.

Figure 1

Schematic Overview of the Hypotheses on the Relation between Friendship and Loneliness in Youth
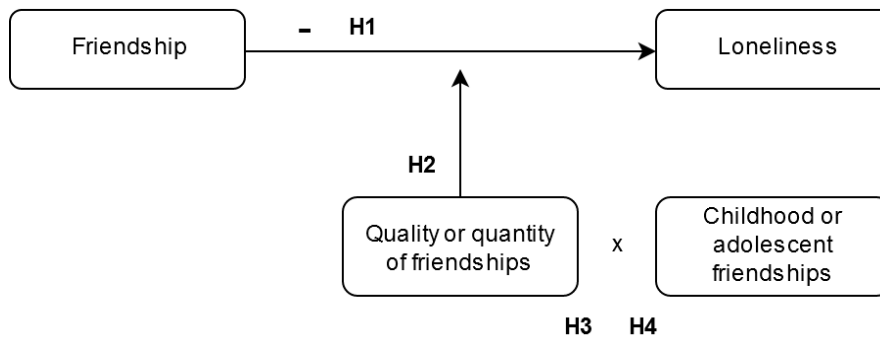
Method

Literature Search

This study is conducted with the use of the database of MASLO (the Meta-Analytic Study of Loneliness) project (Maes et al., 2019). The MASLO-project contains studies that have researched loneliness, using one of the predominant standardized loneliness measures. More details about the literature search can be found in a paper by Maes et al. (2019). The databases used during the literature search are PsychInfo, ERIC, PubMED, and Web of Science. Keywords mainly included the names of the standardized loneliness questionnaires. At the Open Science Framework (https://osf.io/tzg32/) a full list of keywords can be found. The database contains articles from empirical journals, books and book chapters up until 2016. In total, the MASLO-project includes more than 2,300 reports from over 60 countries.
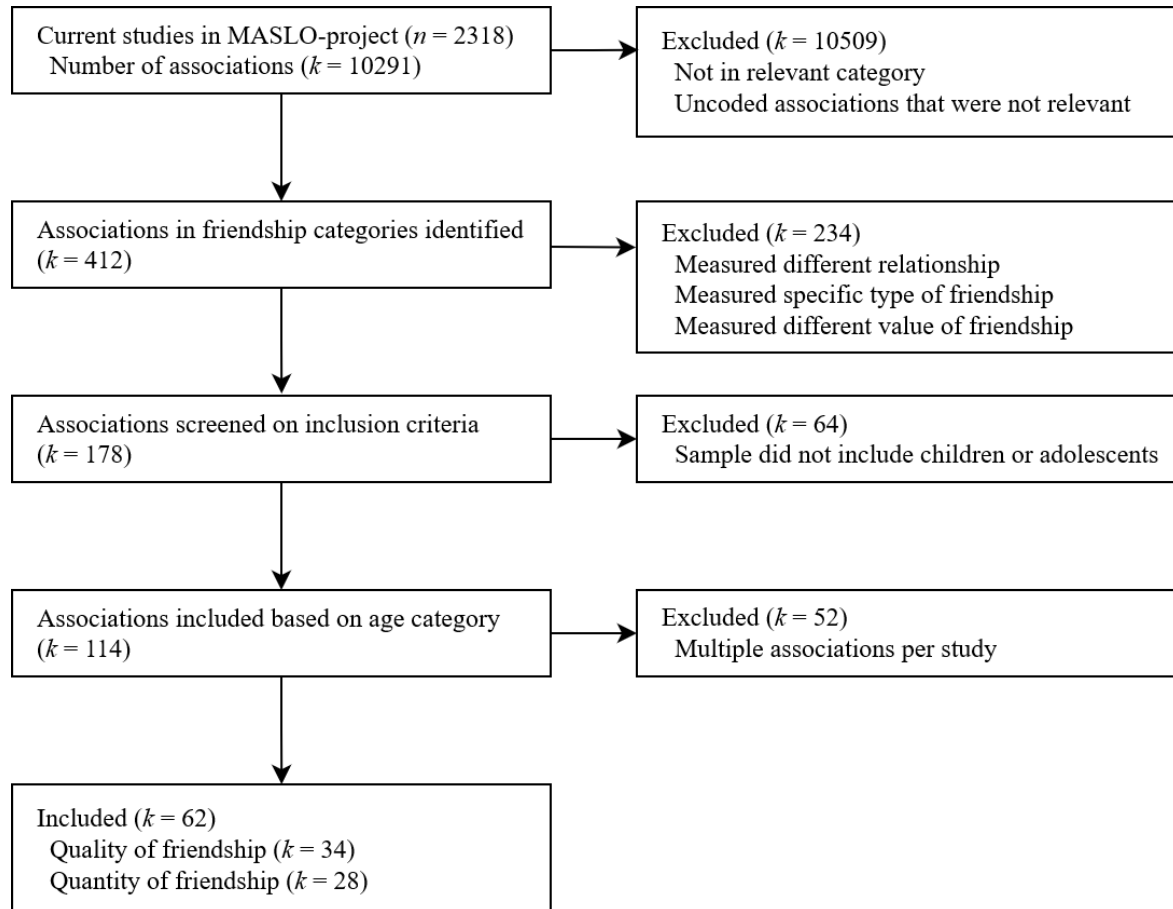
Selection of Studies

From this database, the relevant associations between quality of friendship or quantity of friendship and loneliness were identified. First, all associations coded as one of these two categories were included, and all uncoded associations were checked for relevancy. The remaining associations were screened on a few inclusion criteria. Associations reflecting quality of friendship, and corresponding values such as security and reciprocity, were included. Associations for quantity of friendship were included when they reflected the number of friends or the frequency of contact. Associations were excluded when they reflected relationships other than friends (i.e. family, romantic partners), specific type of friendships (i.e. online friendships or a specific focus on opposite sex friendships), or when the measure of friendship was irrelevant for the current research question (i.e. length of friendship, social network size). This resulted in 178 remaining studies.

In the next step, only associations within the age category child ($\leq$12 years old or $\leq$ 6th grade) and adolescent (12-21 years old or >6th grade) were selected. These were chosen to test whether the association between loneliness and friendship differs for these two age categories. After this step, a total of 114 associations from 75 different studies remained. Because many studies included multiple associations, the same sample would be used twice, which could lead to one study having more weight in the meta-analyses than other studies. This was solved by deleting the association that was least relevant, or by calculating the mean effect size for these

associations. In total, 62 associations from 62 studies were included. For an overview of the number of included and excluded associations, see the flow diagram in Figure 2.

Figure 2

Flow Diagram

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┌─────────────────────────────────────────┐        ┌──────────────────────────────────────────────┐
│ Current studies in MASLO-project (n = 2318)│──────▶│ Excluded (k = 10509)                          │
│  Number of associations (k = 10291)       │        │   Not in relevant category                    │
└─────────────────────────────────────────┘        │   Uncoded associations that were not relevant │
                   │                                 └──────────────────────────────────────────────┘
                   ▼
┌─────────────────────────────────────────┐        ┌──────────────────────────────────────────────┐
│ Associations in friendship categories identified │──▶│ Excluded (k = 234)                            │
│ (k = 412)                                 │        │   Measured different relationship             │
└─────────────────────────────────────────┘        │   Measured specific type of friendship        │
                   │                                 │   Measured different value of friendship       │
                   ▼                                 └──────────────────────────────────────────────┘
┌─────────────────────────────────────────┐        ┌──────────────────────────────────────────────┐
│ Associations screened on inclusion criteria │────▶│ Excluded (k = 64)                             │
│ (k = 178)                                 │        │   Sample did not include children or adolescents │
└─────────────────────────────────────────┘        └──────────────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────────┐        ┌──────────────────────────────────────────────┐
│ Associations included based on age category │────▶│ Excluded (k = 52)                             │
│ (k = 114)                                 │        │   Multiple associations per study             │
└─────────────────────────────────────────┘        └──────────────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────────┐
│ Included (k = 62)                         │
│   Quality of friendship (k = 34)          │
│   Quantity of friendship (k = 28)         │
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Coding of Study Characteristics

The coding included characteristics of the study (i.e. country, sample size, variables), the publication year, and data for effect size computations of the associations. Each study was coded by a team of trained graduate and undergraduate psychology students (Maes et al., 2019). Coded data that was irrelevant for the analysis of this study was deleted.

The studies selected were published between 1987 and 2016. Sample sizes varied between 16 and 1,106 participants, with a total of 18,666 participants. The age category children was coded as 0 ($k = 26$), and the age category adolescents (12-21 years or > 6th grade) was coded

as 1 (k = 36). The participants mean age varied from 8 years to 21 years old (M = 14.3, SD = 3.7), with a mean age of 9.8 years for the age category children, and a mean age of 16.0 years for adolescents. Of the participants, 47.7% of the participants was male (k = 61). For all associations, the value that described the correlation between loneliness and aspect of friendship was coded as 0 (quality of friendship) or 1 (quantity of friendship). When this value was not available for the total sample, the weighted correlation was computed based on the subgroups.

Computation of Effect Sizes

The data from the MASLO-project includes the values of the associations. Because the variance of the coefficient strongly depends on the correlation, meta-analyses are not directly performed on these values (Borenstein et al., 2009). These correlations are first converted to the Fishers' z scale with the following formula:

$$z = 0.5 \times ln \left(\frac{1+r}{1-r} \right)$$

In this formula, r reflects the Pearson's correlation coefficient. After conducting the meta-analyses, the results were converted back into Pearson's correlations for a more easy interpretation with the following formula:

$$r = \frac{e^{2z} - 1}{e^{2z} + 1}$$

These correlations can further be interpreted with .30, .50, and .70 as benchmarks for respectively small, medium, and large effect sizes (Dancey & Reidy, 2007). Besides Fisher's z, the standard error is used to weigh the different studies. To compute the standardized error, the following formula is used:

$$SE_z = \sqrt{V_z}$$

In this formula, V_z reflects the variance. The variance was calculated with the following formula:

$$V_z = \frac{1}{n-3}$$

Analysis of Effect Sizes

Three different analyses are used in this study: a basic meta-analysis, the moderator variable analyses and the publication bias analysis. The analyses will be performed using JASP (Version 0.14.1.0; JASP Team, 2020). For the basic meta-analysis, a random effects analysis is used to test the overall relation between friendship and loneliness (Borenstein et al., 2009). Each study is weighted by its sample size. With the use of a basic meta-analysis, results can be generalized beyond the studies that are included in the data set. The default model, Restricted Maximal Likelihood model, is used.

A moderator variable analysis is used to test which factors can explain variability in effect sizes (Field & Gillet, 2010). In this study, two moderator variable analyses for categorical moderators were conducted, regarding the aspect of friendship and regarding the interaction between aspect of friendship and age category. When the moderator is significant, this means that there is a significant difference between the subgroups of the moderator in their prediction of the mean effect size. This indicates that the relation between two variables differs per subgroup of the moderator.

Last, the potential impact of publication bias was tested. Because studies with smaller effect sizes often do not get published, it is important to check whether the included group of studies is a biased selection (Field & Gillet, 2010). First, a Funnel Plot was generated to check for equal distribution of the effect sizes of both larger and smaller studies in a triangle shape, with studies converging more closely around the true mean when the standard error decreased. Asymmetry in the graphical representation suggests publication bias. Next, Egger's linear regression test was used to examine whether there is a significant relation between the size of the study and its effect size. A significant correlation implies publication bias.

Results

Main Effect: Friendship and Loneliness

For the overall relation between friendship and loneliness, a significant medium effect of $B = -.34$ ($k = 62$, $SE = 0.03$, 95% CI = [$-.40$, $-.29$], $p < .001$) was found. For interpretation Fishers' z is transformed back to Pearson's correlation ($r = -.33$). This result indicates that youth with lower quality and quantity of friendships have higher loneliness scores. Moreover, there was significant heterogeneity among the effect sizes ($Q = 985.99$, $p < .001$). Therefore, in order

for this variability in effect sizes to be explained, it is useful to conduct moderator analyses. This is further supported by the I^2 statistic of 92%, indicating a high degree of heterogeneity. Therefore there is a high possibility that differences in studies are not due to chance.

Table 1

Moderation Analyses of Aspect of Friendship and Age Category on the Relation between Friendship and Loneliness in Youth

Analysis	B	SE (B)	CI Lower	CI Upper
Moderation model				
Aspect of Friendship				
Intercept	−.28***	0.04	−.35	−.20
Aspect of Friendship	−.13*	0.05	−.23	−.02
Interaction model				
Intercept	−.29***	0.05	−.39	−.18
Age Category	.02	0.08	−.13	.17
Aspect of Friendship	−.004	0.08	−.17	.16
Age Category × Aspect of Friendship	−.18	0.11	−.39	.04

Note. B is the regression coefficient, based on Fisher's *z*; *SE (B)* is the standard error of the regression coefficient; *CI* is confidence interval of 95%.

*p ≤ .05. **p ≤ .01. ***p < .001.

Hypothesized Moderator Analyses

To examine whether the negative relation between friendship and loneliness differs between quality and quantity of friendship, a categorical moderator analysis was performed. When comparing these two aspects of friendship, the results of the moderator analysis yielded a significant difference ($Q = 853.26$; $p = <.001$). This indicates that the strength of the association between friendship and loneliness was significantly moderated by aspect of friendship, see Table 1. For interpretation, Fishers' *z* was converted back to a Pearson's correlation. The estimated moderation effect of quality of friendship was stronger ($r = -.38$) than for quantity of friendship

(r = −.27).

      A second categorical moderator analysis was conducted to examine whether the moderating effect of aspect of friendship on the association between friendship and loneliness differs between child friendships and adolescent friendships. This model was significant (Q = 761.35; p < .001), but the interaction between aspect of friendship and age group was not significant (p = .105). This means that there is no evidence that the moderating effect of aspect of friendship on the main effect differs between childhood friendships and adolescent friendships. In this model, the effect of the moderator aspect of friendship was no longer significant (p = .961). The intercept, however, was significant (p < .001) in this model. This could indicate a relation between the two moderators, for example suggesting that the earlier moderating effect of aspect of friendship was actually dependent on the moderating effect of age category. To examine whether there was indeed a relation between these two moderators, a chi-square test of independence was performed. The relation between these variables was not significant (χ^2 (1, N = 62) = 2.84, p = .092). This means that there is no significant overlap between the two moderators. This finding indicates that studies examining one aspect of friendship, were not more likely to have a certain age group sample.

Publication Bias

      In addition to the classical meta-analysis and moderator analyses, two techniques were used to examine the potential effect of publication bias on the results of the study. First, a funnel plot was plotted, as shown in Figure 3. This funnel plot showed no evidence for publication bias, since no large asymmetry was detected in the distribution of observed effect sizes. Second, an Egger's regression analysis was conducted to statistically test for publication bias. This test was not significant (p = .82). Taken together, both the funnel plot and Egger's test do not indicate that a publication bias impacts the results of the study.

Figure 3

Funnel Plot of the 62 Effect Sizes
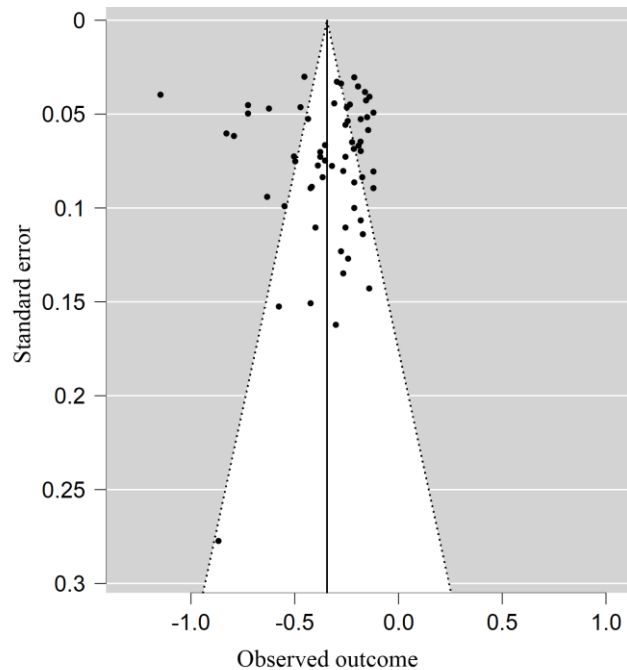
Discussion

The aim of this study was to examine the relation between loneliness and the quality and quantity of friendship in youth, using a meta-analysis. Interventions focusing on social relationships haven't been highly successful (Masi et al., 2011). A better understanding of how friendship is associated with loneliness is needed to improve the focus of these interventions. Overall, the findings suggest that youth with fewer friends and lower quality friendships feel lonelier than youth with more friends and higher quality friendships. The relation between friendship and loneliness was stronger for quality of friendship than quantity of friendship. This is the same for both children and adolescents.

Loneliness and Friendship in Youth

The relation between quality and quantity of friendship and loneliness was negative. These results indicated that youth with less friends and lower quality friendships feel lonelier than youth who have a higher number of friends and higher quality friendships. This finding is in line with both hypothesis 1 and earlier research that showed a negative association between friendship and loneliness in youth (Schwartz-Mette et al., 2020; Vanhalst et al., 2014). This can

be explained by the fact that friendships during youth are important for both their social and emotional development, providing social support and emotional security (Bukowski et al., 1998; Poulin & Chan, 2010). The (perceived) lower quality and quantity of friendship can lead to feelings of loneliness, as the friendships might not provide the social and emotional benefits youth seek. The negative relation between quality and quantity of friendship and loneliness also underlines the importance of friendships to protect adolescents from experiencing loneliness. This is also in line with earlier research on how friendships can combat loneliness, possibly long-term (Nicolaisen & Thorsen, 2017; Renshaw & Brown, 1993).

Moderating Effect on Friendship and Loneliness

The relation between loneliness and quality and quantity of friendship was significantly moderated by aspect of friendship. This result indicates that the finding that less quality and quantity of friendship leads to more feelings of loneliness, depends on the way friendship is measured. The association between friendship and loneliness is stronger when friendship is measured by its quality, such as the experience of security and reciprocity, than when friendship is measured by number of friends and frequency of contact. This finding is in accordance with hypothesis 2 and earlier research that underlines the importance of quality of friendship in other contexts of adolescence. Examples are the protection against the negative effects of adjustment problems, bullying, and other negative stress sources in youth (Malcolm et al., 2006; Waldrip et al., 2008;). However, considering the limited research available on this topic in relation to loneliness, this result based is able to add more substantial evidence to this research area.

A difference between children and adolescents in how quality and quantity of friendship are related to loneliness, could not be established. No interaction effect between aspect of friendship and age category was found. Therefore, there is no evidence that supports hypothesis 3, that during adolescence, quality of friendship is a more important explanation for the relation between friendship and loneliness than quantity of friendship. Also, no results indicated that during childhood, the quantity of friendship is a more important explanation for the association between friendship and loneliness than quality of friendship (hypothesis 4).

A possible explanation why no difference between children and adolescents was found, is because the individuals from the children age category may be older than the children on which the hypothesis is based. The age of the children in the sample ($M = 9.8$) may be closer to the

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early adolescent phase, than the early or middle childhood phase. Therefore, their friendships show more similarities with the form and function of adolescent friendships and no differences between the age groups could be found. However, this explanation has its limitations, since there is a large age gap between the mean age of the children's age group ($M = 9.8$) and the adolescents age group ($M = 16$). Therefore the two samples are possibly substantially different from each other in terms of social and emotional development (Erwin, 1998). This means that even if the childhood sample showed similarities with early adolescence, a significant difference in the meta-analysis would have been probable due to the remaining age gap. A last explanation is that there simply is no difference in how quality and quantity of friendship affects children and adolescents, but that children and adolescents are different in what they define as high quality and quantity of friendship. Friendship quality can equally matter for children and adolescents, as indicated by the current study, but adolescents may value emotional security and intimacy in high quality friendships more than children (Erwin, 1998). This means that the changing form and function of friendships during development could still be true, but in relation to quality and quantity of friendship, it is the values reflecting quality or quantity of friendships that change, not the importance of one aspect over the other. This explains the discrepancy between the current results and the theories on which the hypotheses were based.

Strengths and Limitations

Strengths of this study are mainly methodological. First, with the use of a meta-analysis, this study was able to summarize a larger set of data on the topic of loneliness and friendship in youth. Therefore, the estimated effect sizes of this study are more reliable and statistically precise than results from the individual studies. Also, by combining multiple studies, the sample size is increased. Therefore it is possible to make stronger claims about the population of interest, in this case youth. Second, this meta-study not only summarized data, but also was able to find effects that individual studies haven't examined before. Most included studies only looked at one aspect of friendship, its quality or quantity. This meta-analytic study was able to compare quality and quantity of friendship by combining these individual studies. A final strength of this study is that no evidence of publication bias was found. This suggests that this study was able to summarize the existing evidence on loneliness and youth by including all important studies, and not only the published studies that found a clear effect.

Besides the strengths of this study, there are a few limitations that are worth mentioning. A first limitation has to do with the topic of research. The quality of friendship is a highly subjective variable. For example, Lodder et al. (2017) showed that lonely adolescents evaluated their friendship less positively than their friends did. The number of friends is a more quantifiable variable than quality of friendship, but still partly subjective since youth may have different standards for when an acquaintance is considered as a friend, resulting in a higher or lower number of friends (Erwin, 1998). The lack of objectivity is also affected by the fact that quality and quantity of friendship are most often measured by self-rated questionnaires. Therefore, it is important to keep in mind that conclusions on this topic may partly reflect a subjective perspective of reality. This limitation does not make the research question less valuable, as it is still important to understand how subjective feelings can have an actual impact on mental health.

Other limitations are based on the methodological flaws. A first limitation is that only cross-sectional data was included in this meta-analysis. This means that the strength of associations between two variables could be analyzed, but not its direction. Therefore a causal relation, in which a lack of friendship leads to loneliness, could not be established. It is also possible that the opposite is true and that loneliness contributes to behavior that negatively affects friendships. Similar as to how depressive symptoms can also lead to problems in friendship (Hames et al., 2013). In the case of depression, certain cognitive biases regarding for example emotional regulation, memory and interpretation of social interactions, can negatively affect how friendships are formed and maintained (Everaert et al., 2012).

A second limitation is that generalizations need to be done with care, since the included studies are limited in their representation of a larger population. This is because the existing research field on the topic of friendship and loneliness lacks diversity, which is reflected by the included studies in this meta-analysis. For example, the included studies were mainly conducted in the United States ($k = 42$). Diversity in SES-level or school-type could not be established, since many studies did not report SES-levels ($k = 31$) or school-types ($k = 25$). For more representative conclusions, research on loneliness and friendship needs more diversity in samples. To conclude this diversity, it needs to measure and report all sample characteristics.

A last limitation is that little attention has been paid to the quality of the individual studies included. It is possible that data from studies with unrepresentative samples or faulty

statistical analysis are included. Therefore it is possible that conclusions of this study are partly based on flawed data.

Practical Implications and Future Research

Findings of this study have practical implications for interventions. First of all, the evidence for the negative relation between friendship and loneliness confirms the need for interventions that focus on establishing friendships in youth. Friendships can provide for social and emotional need that youth seek during this developmental phase. Second, the conclusion that quality of friendship is a more important aspect than quantity of friendship in the context of loneliness, can shed a new light on the focus of interventions. Earlier interventions for youth who experience loneliness mainly focused on creating opportunities to meet possible friends (Masi et al., 2011). These interventions seem to be more focused on the number of friendships. However, following this research, it can be more fruitful to support youth in forming and maintaining higher quality friendships. By focusing on the quality of friendships, for example by learning how to offer each other security, the social and emotional needs of youth may be more fulfilled.

Based on this study, no large modifications between interventions for different age groups are needed, since the importance of quality of friendship in comparison with quantity of friendship is the same for both children and adolescents. However, there are possible differences between children and adolescents in what specific qualities they value in friendships. Therefore, future research could focus on these differences. Results can be used for modifications for interventions for different age groups.

Besides practical implications for interventions, the main findings of this study impact future research on youth. First of all, the findings can impact how friendship is measured in relation to loneliness in youth. This study found that the relation between friendship and loneliness is stronger when friendship is measured by its quality rather than its quantity. This suggests that when researching other aspects of the association between friendship and loneliness, it may be best to look at qualitative measures of friendship for higher measurement validity. Second, this study gives direction to further research on the topic of friendship and loneliness in youth. Since quality of friendship is more important than quantity of friendship, it might be interesting to look at what friendship qualities are most beneficial for protecting against loneliness. This can improve the focus of interventions even more.

Conclusion

       This meta-analytic study summarizes the existing data on loneliness and friendship in youth. The findings suggest that youth with lower quality friendships and a lower number of friends experience more loneliness. This result depends on the way friendship is measured. When friendship is measured by its quality, for example the security and reciprocity in a friendship, the effect is bigger than when friendship is measured by the number of friends and frequency of contact. The importance of quality of friendship in relation to quantity of friendship is not different between friendships of children and friendships of adolescents.

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