Negative Interpretation Bias and Depression: The Moderating Effect of Adolescents' Friendship Quality

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Abstract

Depression has its most common onset in adolescence and can lead to further detrimental health problems in adulthood. The current study investigated possible underlying mechanisms such as negative interpretation bias and friendship quality in the development and maintenance of depression. Of particular interest was whether adolescents' high-quality friendships can moderate the effect of negative interpretation bias on depression. The current study used secondary data of 1144 Dutch high-school students (M_{age} = 12.81, 50.8% male) who filled in self-report questionnaires that measured their friendship qualities, negative interpretation bias and depressive symptoms. To investigate the hypotheses, a PROCESS analysis by Hayes was conducted in SPSS. Results indicated that negative interpretation bias and friendship quality both significantly contribute to depression. Additionally, high-quality friendships buffered the relationship between negative interpretation bias and depression. The findings suggest that next to offering training to change adolescents' negative interpretations, friendship quality enhancing interventions should be offered in order to protect adolescents from developing depression. However, as the moderating effect of friendship quality in relation to negative interpretation bias and depression has not been investigated up to this point, further research is needed to investigate whether the findings still hold after addressing the present study's limitations.

Keywords: depression, negative interpretation bias, friendship quality, peer attachment, adolescence

Negative Interpretation Bias and Depression: The Moderating Effect of Adolescents' Friendship Quality

Depression is the most prevalent mental health disorder around the world (APA, 2022) and has its onset most commonly in adolescence (Sfärlea et al., 2021). Whereby adolescents' age group is considered to range between 10 and 19 years old (WHO, 2021). According to the World Health Organization (WHO, 2021), approximately 3.9% of adolescents suffer from depression which is defined by a negative affective state with disturbances in cognition and certain physical symptoms (Sfärlea et al., 2021). Several symptoms help to identify depression in individuals, such as a depressed mood or a loss of pleasure in almost all activities (APA, 2022; Dowd, 2003). Furthermore, an interplay of negative cognitions, emotions and behaviors seems to be responsible for the development and maintenance of depression (Sfärlea et al., 2021). As depression is fairly prevalent during adolescence and decreases adolescents' quality of life, it is important to get a better understanding of how depression develops in order to try to prevent negative health consequences (Hards et al., 2019).

Regarding the development of depression, several theories acknowledge the problem of cognitive biases (Hards et al., 2019; Orchard et al., 2016). One such cognitive bias is negative interpretation bias. People prone to use negative interpretation bias tend to appraise an ambiguous situation, which allows for different interpretations, negatively rather than neutral or positively (Berna et al., 2011; Gibb et al., 2022; Orchard et al., 2016). Negative interpretation bias is part of making mistakes in information processing (Orchard et al., 2016) and has been repeatedly identified in depressed individuals in clinical as well as non-clinical settings (Berna et al., 2011; Lawson et al., 2002). One theory commonly used to explain the relation of negative interpretation bias and depression is Beck's cognitive theory of depression. This theory states

that depression is the result of two main underlying processes, namely negative self-evaluation, and negative interpretation bias (Orchard & Reynolds, 2018). Negative self-evaluation is a cognitive bias which leads individuals to attribute negative traits and characteristics to themselves (Hards et al., 2019). While people engaging in negative self-evaluation generate more negative images of themselves (Hards et al., 2019), people prone to use negative interpretation bias tend to evaluate ambiguous social situations more negatively (Berna et al., 2011; Gibb et al., 2022; Orchard et al., 2016). Therefore, whereas self-evaluation is directed towards the individual (Orchard & Reynolds, 2018), interpretation bias is more focused on the interpersonal context (Gibb et al., 2022). According to Beck's cognitive theory of depression, both underlying processes are acting as a cognitive vulnerability for depression (Hards et al., 2019). The current study focuses more on the interpersonal context, wherefore it will go more in detail into negative interpretation bias. Previous findings have supported the concept that negative interpretation bias predicts major depression (Gibb et al., 2022). Taking the relationship between negative interpretation bias and depression into account could offer one plausible explanation for why the most common onset of depression is during adolescence. Adolescents' frontal cortex which is linked to cognitive functioning and emotion regulation is still developing. Considering that their cognitive functioning is not yet fully developed could give rise to cognitive biases like interpretation bias which in turn then could contribute to low mood and depression (Orchard et al., 2016). Furthermore, negative interpretation bias might also be related to the maintenance of depression in adolescence. Several studies support the concept of depressed individuals' proneness to cognitive biases such as negative interpretation bias which may contribute to the maintenance of depression (Gibb et al., 2022; Joormann et al., 2014). Supporting the relationship between negative interpretation bias and depression in adolescence

are findings by various studies, demonstrating that reducing negative interpretation bias trough training lowers negative mood and depressive symptoms (Gibb et al., 2022; Joormann et al., 2014). One such training is the Cognitive Behavioral Therapy (CBT), which focuses on identifying, evaluating, and ultimately changing these negative interpretations, with the aim of lowering people's negative affect (Dowd, 2003; Orchard & Reynolds, 2018). More specifically, the person is shown how unrealistic their negative thoughts are by evaluating the evidence and is taught how to replace them with more positive but realistic automatic thoughts instead (Dowd, 2003). Altogether, it seems like negative interpretation bias is an important contributor to depression, and that especially adolescents are prone to such biases due to their developmental changes. However, since negative interpretation bias has been found to contribute to the development as well as the maintenance of depression, the directionality of the relation between negative interpretation bias and depression is not yet clear (Orchard et al., 2016).

Next to cognitive biases, environmental factors also play a role in developing depression in adolescence. One of which is friendship quality, which is defined as friends' companionship, security, support, closeness, and conflict (Bakalım & Taşdelen-Karçkay, 2016). More specifically, companionship is regarded as the time that adolescents want to voluntarily spend with their friends, whereas security is expressed by the belief that the friendship will last and that they can rely on their friends (Bakalım & Taşdelen-Karçkay, 2016; Dryburgh et al., 2021). Moreover, support refers to the mutual help friends offer to each other, while closeness is defined by how emotionally connected they are. Lastly, conflict is established by the times that friends engage in disagreements (Bakalim & Tasdelen-Karçkay, 2016). Many of these subcomponents of friendship quality have been found to influence depression in adolescence. For instance, studies have reported that adolescents who lack the social support of friends are

more likely to experience more depressive symptoms (Hartup, 1996) and that sometimes their depression is caused by unresponsive relationships (Armsden & Greenberg, 1987). Similarly, experiencing problems with peers has been shown to be a cause of depression (Konac et al., 2021). Moreover, studies have shown that adolescents' poor attachment quality to their friends is a predictor for developing depressive symptoms later on (Armsden & Greenberg, 1987; Schwartz-Mette et al., 2021). Overall, adolescents' negative experiences with friends appear to be important for the development of depression. On the other hand, adolescents' high-quality friendships have been suggested to be a possible protective factor against depression (Zhao et al., 2021). As previously mentioned, friendship quality comprises multiple environmental factors and according to the literature, those factors indicate an indirect but important function of others, in protecting individuals against depression (Zhao et al., 2021). For example, the role of adolescents' feeling of closeness supports the importance of environmental protective factors in depression. As adolescents who feel connected, either at home to their parents or in school to their peers, are less likely to experience depressive symptoms (Costello, 2008). Furthermore, social support has also been found to act as a protective factor against depression in adolescence (Hartup, 1996; Zhao, 2021). Although some studies have shown that social support from family members such as parents is most important in defensing depression (Zhao, 2021), other studies suggest that having supportive friends improves self-esteem and lessens depression in adolescence (Hartup, 1996). This possible shift of importance from parents' to peers' support during the transition from childhood to adolescence might be explained due to adolescents becoming more independent of their parents and their friends becoming increasingly more important (Armsden, & Greenberg, 1987; Raja et al., 1991; Zhao et al., 2021). Taken together,

high friendship quality and its subcomponents have been repeatedly suggested to be important protective factors against depression.

In general, previous research suggests strong support for negative interpretation bias contributing to depression (Gibb et al., 2022; Joormann et al., 2014; Orchard et al., 2016). Additionally, many studies have investigated the negative relation between friendship quality and depression, indicating that adolescents with higher quality-friendships experience fewer depressive symptoms than adolescents' with low quality-friendships. (Armsden & Greenberg, 1987; Hartup, 1996; Schwartz-Mette et al., 2021, Zhao et al, 2021). Combining previous literature findings suggests that adolescents' negative interpretation bias and their likelihood of developing depressive symptoms might be influenced by friendship quality. Specifically, it could be suggested that high quality friendships lessen the relationship between negative interpretation bias and depressive symptoms, as it might offer adolescents the opportunity to give less value to their negative interpretations as well as their negative thoughts which are associated with depression. Accordingly, adolescents with high quality friendships are able to confide in their close friends who will offer them support and therefore, might protect them against their negative depressive thoughts and interpretations. However, a preliminary literature search indicates that no previous literature has researched the potential moderating effect that friendship quality might have to either lessen or enhance the relationship between adolescents' negative interpretation bias and depression. This is unfortunate, since depression during adolescence increases the risk to develop another mental health disorder in adulthood, as well as possible suicide risk and self-harm. A better understanding of how depression develops is important in order to try to prevent those negative consequences (Hards et al., 2019).

Therefore, the aim of the present study is to contribute to the previous literature about the underlying mechanisms of depression during adolescence, namely friendship quality and negative interpretation bias. Adolescents were particularly chosen for this study as they are more prone to develop depression (Sfärlea et al., 2021) and their most important relationships during this developmental stage are their friendships (Armsden, & Greenberg, 1987; Zhao et al., 2021). The current study aims to replicate the previous findings of negative interpretation bias leading to depression as well as adding to the limited literature about friendship quality acting as a protective factor against depression. Additionally, to address the above-mentioned gap in the literature, the main aim of the study is to explicitly investigate the moderating role of friendship quality in the relationship between negative interpretation bias and depression. Therefore, the present study will try to answer the question: To what extent are interpretation bias and friendship quality related to depression in adolescents and is the relation between negative interpretation bias and depression moderated by friendship quality? Based on previous literature, three distinct hypotheses can be derived. First, based on previous findings (Gibb et al., 2022; Hards et al., 2019; Orchard et al., 2016), the first hypothesis states that negative interpretation bias and depression are positively related. Specifically, it is predicted that adolescents with more negative interpretation bias experience more depressive symptoms. Additionally, based on previous findings (Armsden & Greenberg, 1987; Schwartz-Mette et al., 2021; Zhao et al., 2021), the second hypothesis states that friendship quality and depression are negatively related. It is predicted that adolescents with higher friendship qualities experience fewer depressive symptoms. Lastly to address the gap in the literature, the third hypothesis states that friendship quality moderates the effect of negative interpretation bias on depression. More specifically, it is

predicted that adolescents with high friendship qualities have fewer depressive symptoms even when they experience higher negative interpretation bias.

To answer the current research question, the present study will examine secondary data of a longitudinal study conducted by Radboud University Nijmegen. In order to investigate the three hypotheses, adolescents of six different high schools were asked to fill in questionnaires about their friendship qualities, negative interpretation bias and depressive symptoms.

Method

Participants

The current study focuses on the adolescent population. Therefore, high school students were recruited, ranging between the ages of 10 and 14 (M_{age} = 12.81; *SD* = .42). A power analysis indicated that the current study needs a sample size of 543 students, to detect an effect of .02 with a power of .95 and a significance level of .05. Ultimately, a total of 1144 adolescents agreed to participate in the study. Of this sample, 50.8% (*n* = 581) of the participants were male and 49.2% (*n* = 563) were female. Most participants had a Dutch background (94.9%, *n* = 1086), after which the second most reported ethnical background was Turkish (1.1%, *n* = 13) followed by Moroccans (0.9%, *n* = 10). Furthermore, 85.4% (*n* = 977) of the adolescents reported living with both of their parents, 6.4% (*n* = 73) reported to only live with one parent and 8% (*n* = 91) had a different caretaker altogether. Regarding participants' education level, 68.4% (*n* = 783) reported attending preparatory secondary school for professional education (HAVO), 28.1% (*n* = 321) preparatory secondary school for university (VWO) and 3.5% (*n* = 40) preparatory secondary school for technical and vocational training (VMBO).

Measures

Depression

Depression was assessed using the CES-D Iowa short form (Kohout et al., 1993). This questionnaire consists of 10 items. Some example statements were “I felt like everything I did was an effort.” and “I felt sad.”. Participants were asked to report how often they had experienced those feelings during the past week, by rating the items on a 4-point scale, ranging from *hardly ever or never (< 1 day)* (0) to *much or most of the time (5-7 days)* (3). Participants could score from 0 up to 30 points on this scale, while scoring higher indicated higher levels of depression. The Cronbach’s alpha was reported to be α = .76 (Kohout et al., 1993), while in the current study the Cronbach’s alpha was established to be α = .80.

Interpretation Bias

To assess the level of interpretation bias, two subscales of the Social Situations subscale of the Adolescents’ Interpretation and Belief Questionnaire (AIBQ; Miers et al., 2008) were used. After being presented with a social scenario, participants had to report (1) the likelihood of what thoughts would pop up in their minds and (2) which explanation they believed was most likely. In the first subscale, participants were presented with five social scenarios, for example “You’ve invited a group of classmates to your birthday party, but a few have not yet said if they’re coming.”. They were then asked why they think that some people have not said anything yet. Wherefore, they got three different possible explanations for the certain scenario, in this case “They don’t know yet if they can come or not.”, “They don’t want to come because they don’t like me.” and “They’re definitely coming; they don’t need to tell me that”. Participants indicated their answers on a 5-point Likert scale, from *does not pop up in my mind* (1) to *definitely pops up in my mind* (5). Participants could score from 5 up to 25 points on this subscale, wherefore, scoring high on the negative interpretation explanations reflected a negative interpretation bias. In the second subscale, they were asked which one of the three possible explanations for the five

scenarios sounded more believable to them, which was then scored on a 3-point scale, *negative interpretation is chosen* (1), *neutral interpretation is chosen* (2) and *positive interpretation is chosen* (3). Participants could score from 5 up to 15 points on this subscale, indicating that participants who scored lower believed the negative interpretations more. The negative interpretation bias variable was computed using the two subscales. It is a combination of participants' indication of the negative explanation that would pop easily in their mind for the first subscale, with the second subscale, indicating which explanation they thought was more likely. Overall, people could score from 10 to 40 points on this scale, whereas after reversely recoding the second subscale, higher scores indicated a proneness to more negative interpretation bias. In the current study, the Cronbach's alpha was established to be α = .72.

Friendship Quality Network

Friendship quality was measured using 12 items of the short version of the Peer subscale taken from the Inventory of Parent and Peer Attachment scale (Armsden & Greenberg, 1987; Raja et al., 1992). The questions of the peer subscale were equally divided into three categories, namely communication, trust and alienation. Example questions were "My friends encourage me to talk about my difficulties" (Communication), "My friends listen to what I have to say." (Trust), and "It seems like as if my friends are irritated with me for no reason" (Alienation). The answer options were scored on a 4-point scale ranging from *almost never* (1) to *almost always* (4). People could score from 12 to 48 points on this scale. A higher score suggested high friendship quality, while using reversed scoring on the alienation category. The Cronbach's alpha was reported to be α = .80 (Raja et al., 1992), while in the current study the Cronbach's alpha was established to be α = .79.

Procedure

The current study used the data collection of the first wave of a longitudinal study which was conducted in 2013 and has been ethically approved by the IRB of the Radboud University Nijmegen, The Netherlands. Six high schools agreed to participate in this study after they obtained information about the study. Parents of the adolescents had to give their consent and were asked to contact the researchers if they did not want their child to participate. Finally, adolescents also had to give their written consent. The adolescents then completed the questionnaires during regular school hours on computers that were provided to them. Undergraduate students who were involved in the project were present during the study at all times. After the study, the adolescents received a small gift for their participation.

Statistical analysis

The data analysis was conducted using the statistical analysis software IBM SPSS Statistics (Version 27.0). First, the data of the independent variable negative interpretation bias, dependent variable depression and moderator friendship quality were checked for outliers and missing data. No outliers or missing data could be detected and therefore, no data was excluded. Next, reversed coding was applied for the necessary items.

Before conducting the regression analysis, the necessary assumptions were tested. With the help of histogram graphs, and skewness and kurtosis values, negative interpretation bias and friendship quality were found to be normally distributed. However, the skewness of depression was found to be 1.44, while the kurtosis of depression was found to be 2.72 indicating that the distribution was skewed to the right. Nonetheless, due to the large sample size in the current study the validity of the results has not been compromised (Hayes, 2014). As a result, the assumption of homoscedasticity was not met after examining a scatterplot. However, the violated assumption of homoscedasticity was controlled for using the heteroscedasticity consistent

standard error HC3 estimator and therefore, did not violate the validity of the current study (Hayes & Cai, 2007). The linear relationships between depression, negative interpretation bias and friendship quality were tested using a scatterplot and were found to meet the assumption of linearity. Furthermore, the assumption of multicollinearity was tested, and found not to be a concern (Tolerance = .909, VIF = 1.1), while the assumption of independent errors was also met (Durbin-Watson = 1.67). Lastly, the histogram and the normal P-P plot of standardized residuals indicated that the residuals are normally distributed and therefore also met the assumption of normality of residuals.

After testing the assumptions, the descriptive statistics of the variables were determined. Furthermore, friendship quality was divided into two categories, namely low and high friendship quality, using the minimum, maximum and mean scores of the current sample as cut-off scores. Thereafter, the hypotheses were tested using the extension PROCESS by Hayes in SPSS, including negative interpretation bias as the independent variable, depression as the dependent variable and friendship quality as the moderator.

Results

Prior to the hypothesis testing, the descriptive variables and correlations were tested (Table 1). Results of the correlations indicate that depression is significantly positively related to negative interpretation bias and significantly negatively related to friendship quality. Furthermore, negative interpretation bias and friendship quality are significantly negatively related to each other. Additionally, depression seemed to be relatively low in the present sample. According to the descriptive variables, friendship quality was divided into two groups, using the minimum and maximum as well as the mean scores to determine the cut-off scores of the

respective groups. Therefore, low friendship quality was determined to range from 15 to 36.79 points, while high friendship quality was determined to range from 36.8 to 48 points.

Table 1

Descriptive Statistics and Correlations for the Variables Depression, Negative Interpretation Bias and Friendship Quality

Variable	*M*	*SD*	Min	Max	1	2	3
1. Depression	5.04	4.31	0	28	—		
2. Negative Interpretation Bias	22.89	4.94	10	40	.404*	—	
3. Friendship Quality	36.8	5.21	15	48	-.379*	-.265*	—

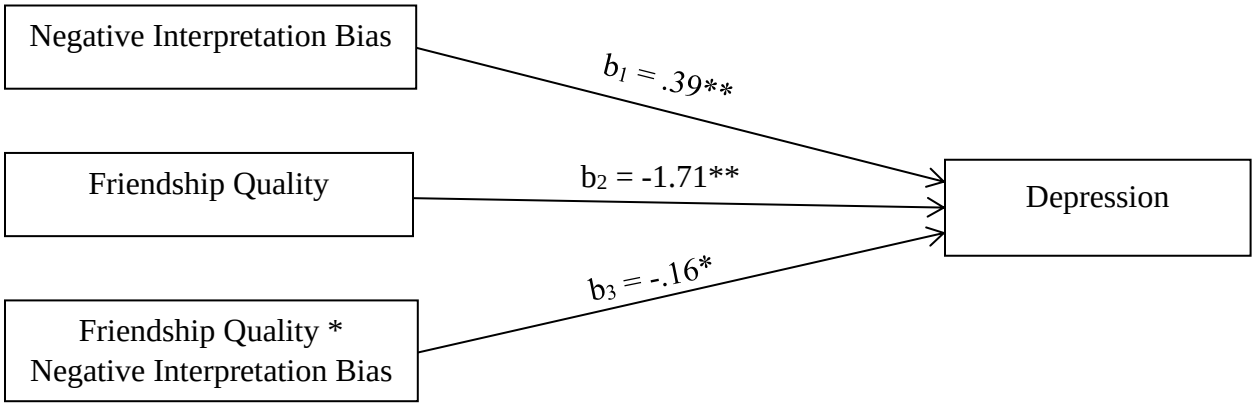
*$p < .001$

The three hypotheses were tested with a moderated regression analysis in PROCESS by Hayes. The overall model was found to be significant, $F(3, 1140) = 80.02$, $p < .001$, $R^2 = .21$, indicating that 21% of the effect on depression was predicted by friendship quality, negative interpretation bias and their interaction. Regarding the first hypothesis, results indicated that negative interpretation bias and depression were significantly positively related, $b_1 = .39$, $t(1140) = 9.57$, $p < .001$, suggesting that an increase in one unit of negative interpretation bias corresponded, on average, to an increase in a depression score of .39 points. For the second hypothesis, results indicated that friendship quality and depression are significantly negatively related, $b_2 = -1.71$, $t(1140) = -7.34$, $p < .001$, suggesting that an increase in one unit of friendship quality corresponded, on average, to a decrease in a depression score of 1.71 points. Furthermore, results of the third hypothesis indicated that the interaction effect of negative

interpretation bias and friendship quality was statistically significant, $b_3 = -.16$, $t(1140) = -3.01$, $p < .01$. The statistical model with the coefficients is presented in Figure 1.

Figure 1

Statistical Path Model of Friendship quality, Negative Interpretation Bias, and their Interaction Effect on Depression

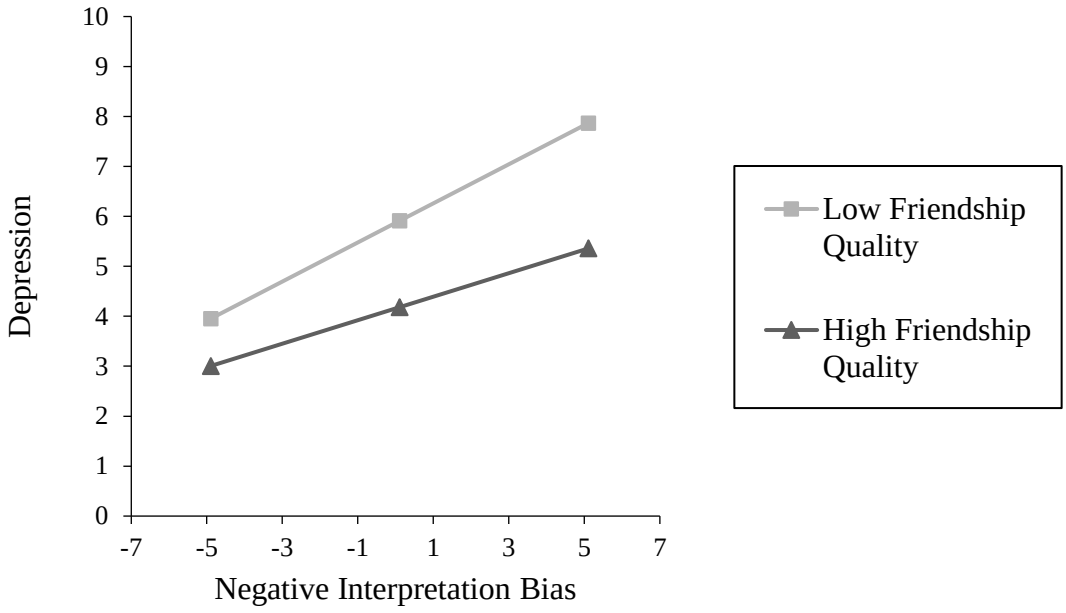


*$p < .01$ **$p < .001$

Regarding the interaction effect, results indicated that for lower friendship quality, negative interpretation bias was found to have a stronger effect on depression, $b = .39$, $t(5) = 9.57$, $p < .001$ suggesting that for low friendship quality, negative interpretation bias increases depression by .39 points. Whereas for high friendship quality, results indicated that negative interpretation bias was found to have a weaker effect on depression, $b = .24$ $t(5) = 7.35$, $p < .001$, suggesting that for high friendship quality, negative interpretation bias increases depression by .24 points. The representation of the interaction effect is presented in Figure 2.

Figure 2

Regression Slopes for Friendship Quality as a Moderator



Note. The moderation effect of low and high friendship quality on the relationship between negative interpretation bias and depression.

Discussion

The aim of the present study is to gain a deeper insight into the underlying mechanisms of depression. Specifically, it was investigated to what extent interpretation bias and friendship quality are related to depression in adolescents and if the relation between negative interpretation bias and depression is moderated by friendship quality. Three hypotheses were investigated using a sample of high school students. The findings support the first hypothesis indicating that adolescents who experience more negative interpretation bias during their social interactions, also suffer from more depressive symptoms. Additionally, the findings also support the second hypothesis, suggesting that adolescents who have high-quality friendships endure fewer

depressive symptoms. Lastly, the present findings lend support to the third hypothesis, suggesting that the effect of negative interpretation bias on depression is lessened for adolescents with high-quality friendships.

In line with previous findings and supporting the first hypothesis, the current results suggest that adolescents experiencing more negative interpretation biases also tend to experience more depressive symptoms (Berna et al., 2011; Gibb et al., 2022; Orchard et al., 2016). Therefore, the findings lend support to cognitive models of depression, suggesting that impaired information processing like negative interpretation bias contributes to the development and maintenance of depression (Orchard et al., 2016). Specifically, Beck's cognitive model of depression lends a possible explanation for the relationship between negative interpretation bias and depression, indicating that an individual's heightened tendency to engage in negative interpretation bias, might make them more vulnerable to developing depression (Orchard et al., 2016; Lawson et al., 2002). Likewise, in the current study, adolescents who were engaging in more negative interpretation bias tended to suffer from more depressive symptoms.

Furthermore, the findings are in line with the second hypothesis and previous research suggesting that high-quality friendships protect adolescents from depression (Yang et al., 2020; Zhao et al., 2021), while adolescents with low-quality friendships suffer from more depressive symptoms (Konac et al., 2021; Yang et al., 2020). The findings suggest that adolescents' positive experiences with their friends may protect them from developing depression. Conversely, adolescents' negative experiences with their friends, might make them more vulnerable to depression. The current findings suggest that the relation between friendship quality and depression may even be stronger than the relation between negative interpretation bias and depression. This finding reinforces the theory that during adolescence, friendships become more

important (Raja et al., 1991; Zhao et al., 2021) as the quality of their friendships seems to have a considerable impact on their mental health. Furthermore, it supports the notion that adolescents' positive or negative experiences with their peers might influence the development of depressive symptoms (Konac et al., 2021; Zhao et al., 2021). The current findings therefore indicate that high quality-friendships do seem to protect against depressive symptoms, while low quality-friendships enhances depression.

The main interest of the present study, the third hypothesis, suggesting that adolescents' friendship quality moderates the relationship between negative interpretation bias and depression has been supported by the present findings. The third hypothesis was based on previous findings acknowledging the effect of negative interpretation bias influencing depressive symptoms (Gibb et al., 2022; Joormann et al., 2014; Orchard et al., 2016), while friendship quality has been suggested to be a potential protective factor of depression (Hartup, 1996; Zhao et al, 2021). Considering the finding that high quality-friendships seem to lessen the relationship of negative interpretation bias to depression in the current sample, reinforces the assumption that experiencing high quality-friendships protect adolescents from their negative interpretation and depressive thoughts, which could be explained by their experienced support. Moreover, adolescents might give less value to their negative interpretations as well as their depressive thoughts when experiencing high quality-friendships. However, it should be noted that high-quality friendships were not able to fully protect against the detrimental effect of negative interpretation bias on depression, suggesting that friendship quality alone cannot protect adolescents from the consequences of negative interpretation bias effecting depression.

As depression has its most common onset in adolescence, it is especially important at this age stage to intervene in order to prevent the development of depressive symptoms to or to lessen

the negative consequences thereof. The present findings suggest that offering training to change adolescents' negative interpretations such as cognitive behavioural therapy could be useful to prevent adolescents from developing depressive symptoms. Furthermore, the current findings suggest that the relationship between friendship quality to depressive symptoms was stronger than between negative interpretation bias and depression. Therefore, the main implication of the present findings is to also administer intervention programs that are directed towards enhancing friendship quality in adolescents in order to reduce their depressive symptoms. Additionally, the current findings offer an important contribution to the gap in the literature of friendship quality acting as a protective factor for the relationship between negative interpretation bias and depression in adolescents.

An important strength of the study is the large sample size, with the number of participants exceeding our necessary sample size of 543. Furthermore, an additional strength of the current study is the reliability of the questionnaires, as every Cronbach's alpha was found to be above .70, indicating that the questionnaires measure the construct reliably. Nevertheless, the present study is not without its limitations. First, the direction of causality could still not be determined in the current study, as causality was assumed but not tested. Previous literature pointed to bidirectionality between negative interpretation bias and depression, however for the present study, causality from negative interpretation bias to depression was assumed. Secondly, as the present sample is made up of Dutch high school students between the ages of 10 and 14, the findings should only be generalized to adolescents with caution.

Future research should address the above-mentioned limitations. Specifically, the problem of causality that the present study could not solve, stresses the importance for future research to address the question of causality. It is still not clear whether negative interpretation

bias influences depression, or if depression influences adolescents to be more prone to negative interpretation bias. Investigating the role of causality is important to prevent depression in the first place. In order to address causality, it would be necessary for future research to manipulate interpretation bias and friendship quality to detect their possible causal role in the development of depression. This would however be ethically questionable to conduct. Therefore, it would be better to address the problem of causality using more complex statistical approaches to take bidirectionality into account. Next, regarding the limitation of generalizability, further research should aim for different target groups to broaden the findings culturally and for different age groups of adolescents. The present sample was made up of Dutch students only, therefore, it is necessary to conduct the present study for different cultures to see whether the findings still hold. Additionally, the current age sample was ranging between 10 and 14 years, as the adolescent population ranges between the ages of 10 and 19 years, future research should investigate the moderating role of friendship quality on the relationship between negative interpretation bias and depression in 15- to 19-year-olds. Next to future research addressing the limitations, further research directions are suggested. Firstly, the present study focused only on negative interpretation bias, however, in order to address Beck's cognitive model of depression, future research should compare negative self-evaluation and negative interpretation bias as possible predictors for depression. Investigating negative self-evaluation and interpretation bias might demonstrate one contributing more to depression than the other, which is ultimately important to determine intervention options. Secondly, as some previous literature suggests parent attachment to be more important than peer attachment, future research should focus on comparing parent attachment to peer attachment in order to determine which is more crucial for the protection against depression. Lastly, future research should take gender effects into account when

assessing the moderating effect of friendship quality. According to previous literature, friendship qualities seem to have a stronger protective role against diverse outcomes for girls than for boys. This might be explained due to girls focusing more on the interpersonal context and connectedness, while boys are more focused towards goals and trying to be autonomous (Zhao et al., 2021). Overall, further research is necessary to address the current study's limitations, while also broadening the findings as the moderating effect of friendship quality has not been investigated before in connection to negative interpretation bias and depression.

In conclusion, negative interpretation bias and friendship quality have been found to independently contribute to depression in adolescence. Particularly, compared to negative interpretation bias, adolescents' low quality-friendships contribute more strongly to the development of depression, whereas high-quality friendships are protecting adolescents from depressive symptoms. Additionally, high friendship quality is buffering the effect of negative interpretation bias on depression in adolescents. Therefore, the findings of the present study suggest that negative interpretation bias and friendship quality are important to consider for the development of depression in adolescence. More importantly, the present study is an important introduction to the gap in the literature about the moderating effect of friendship quality on the relation between negative interpretation bias and depression. However, the findings should be taken with caution as the causality of negative interpretation bias on depression was assumed. Finally, more research is required to address the limitations of the current study, while also addressing future directions of the underlying mechanisms of depression.

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