

Repetitive Negative Thinking outperforms loneliness and lack of social connectedness as a predictor of prospective depressive symptoms in adolescents

Filip Raes¹, Margot Bastin^{2β}, Tina Pede¹, Eline Belmans¹ Luc Goossens², Janne Vanhalst³

¹Research Unit Behaviour, Health and Psychopathology, KU Leuven, Belgium

²Research Unit School Psychology and Development in Context, KU Leuven, Belgium;

³Department of Developmental, Personality and Social Psychology, Ghent University, Belgium

*Corresponding author: filip.raes@kuleuven.be ^βjoint first author

Abstract

Background: Repetitive Negative Thinking (RNT) is a well-established predictor in adolescents of emotional problems, such as depression. Surprisingly little research, however, has looked at the relative importance of RNT vs. more interpersonally relevant variables in the context of depression, such as loneliness and lack of social connectedness.

Objective: The present study, therefore, set out to examine whether RNT is a significant predictor when taking into account the contribution of loneliness and social connectedness.

Methods: A sample of 135 typically developing adolescents ($N = 135$; 79.3% girls; $M_{age} = 17.5$; range 16-21) completed measures of depressive symptoms, RNT, loneliness and social connectedness at two time points with a 3-month interval.

Results: Results showed that above and beyond baseline depressive symptoms, RNT was the only other significant predictor of prospective depressive symptoms.

Conclusions: According to these results, RNT seems a relatively more important factor to consider in the context of adolescent depression than factors in the interpersonal or social context. Consequently, targeting RNT might be expected to yield more significant gains in reducing or preventing depressive symptoms in adolescents compared to focusing on feelings of loneliness or social connectedness – a hypothesis that remains to be tested.

Keywords: depression; Repetitive Negative Thinking; loneliness

Introduction

Knowledge about reliable risk factors for depression is of critical importance, especially in adolescence, given (a) the high prevalence of both clinical and subsyndromal levels of depression in that period (1, 2) combined with (b) the well-documented detrimental and far-reaching consequences of adolescent depression later in life (3, 4) that even exist for subclinical levels of depression (5). The identification of risk factors, therefore, is crucial for targeted prevention. An accumulating body of research suggests that Repetitive Negative Thinking (RNT) may be one such risk factor.

Repetitive Negative Thinking (RNT) refers to excessive and repetitive thinking about current concerns, problems, past experiences or worries about the future (6, p. 192). Depressive rumination and anxious worry are two prototypical examples of

RNT. A vast body of research has shown that RNT is a reliable risk factor for a range of emotional problems and disorders such as depression and anxiety in both adults and adolescents (for reviews, see: 6, 7, 8).

For example, in a longitudinal cohort study in 658 at-risk adolescents Wilkinson et al. (9) found that RNT predicted both the onset of a depressive episode and levels of depressive symptoms over a 12-month interval, when controlled for baseline symptomatology. Likewise, Bijttebier and colleagues (10) showed that, again when controlled for baseline symptom levels, RNT predicted prospective levels of depressive symptoms at 3-month follow-up in 701 adolescents.

Given the above reviewed substantial evidence for RNT as a risk factor for adolescent depression, RNT has also become the focus of preventive

interventions in adolescence (e.g., 8, 11). However, prevention programs targeting an individual or intrapersonal risk factor such as RNT could be criticized because they fail to take the interpersonal or social context into account to a sufficient degree. The same critique applies to research on RNT in adolescent samples. Particularly in adolescence, when forming and maintaining relationships with peers becomes a central developmental task, peer relationships and deficits thereof are known to affect different aspects of psychological health, including depressive symptoms (12). Both loneliness and lack of connectedness could be indicators of such problems in the relational realm. Loneliness refers to the negative feelings that people experience when they are dissatisfied with their social network (13). Lack of connectedness, by contrast, refers to the generalized and presumably deeper feeling that one is a social outsider (14). Loneliness is known to predict levels of and increases in symptoms of depression in adolescents (e.g., 15). Higher scores on measures of social connectedness, which typically comprise both positively phrased items about belongingness and negatively phrased items about feeling an outsider (which are reverse coded), have been found to be associated with lower scores for depressive symptoms in this age group (e.g., 16).

Although loneliness and the experience of failed belongingness, such as lack of social connectedness, clearly are related constructs, it has been suggested that they represent distinct psychological experiences (17). As a result, they may differently predict depressive symptoms. Together, it may very well be that once these social determinants of depression are taken into account, the role of RNT as an individual risk factor for depression would be considerably reduced. Or, vice versa, it may be the case that the role of loneliness and lack of social connectedness in the prospective prediction of depressive symptoms diminishes once RNT is brought into the picture. Surprisingly little research, however, has looked at the relative importance of RNT vs. loneliness or social connectedness in predicting depressive symptoms in adolescents.

The present study had three main objectives. First, we set out to replicate whether RNT is a predictor of prospective depressive symptomatology in a group of adolescents. Second, we checked to what extent RNT would remain a significant predictor when taking into account the role of loneliness and social connectedness, given the salience of social relationships in this developmental phase. Third, and finally, we examined potential moderating effects between RNT and both loneliness and connectedness. It could be, for example, that RNT interacts with such social factors in predicting depressive symptoms, such that loneliness and/or

lack of connectedness would be especially detrimental in the context of depression for adolescents who are characterized by high levels of RNT (cf. 18).

Method

Participants

At baseline (T1) 204 students with a mean age of 17.53 years ($SD = 0.80$; range 16-21; 71.60% girls — $n = 146$) from the eleventh and twelfth grades of three schools participated in the study. The majority of participants described their ethnicity as Belgian (94.10%; $n = 192$), 2.5% as Moroccan ($n = 5$), 1% as Dutch ($n = 2$), and others as Italian, German, and Ecuadorian (n for each = 1). Reports on ethnicity were missing for two participants. Three-month follow-up (T2) data were available for 135 students (i.e., 66.18% of the T1 sample completed the questionnaires a second time; 33.82% of the T1 sample did not; M_{age} T1 = 17.46; $SD = 0.76$; range 16-21; 79.3% girls — $n = 107$). The majority of this group described their ethnicity as Belgian (95.60%; $n = 129$); 1.50% as Dutch ($n = 2$), 0.7% as Moroccan ($n = 1$); and 0.7% as Italian ($n = 1$). For two participants, reports were missing. Some participants were ill at T2. But the substantial drop-out rate at T2 (i.e., 33.82% of the sample present at T1) was mostly due to participants from some classes in one of the schools that had just returned from a multiple-day school trip the night before T2 and declined from participating due to tiredness.

Using t -tests (for continuous variables) and the Chi-square test (for gender), scores on study variables were compared between participants that completed both assessment waves and those that did drop out. The drop-out group did not differ significantly from the remainder of the sample when it came to scores on RNT, $t(201) = 0.85$, $p = 0.40$, social connectedness, $t(123.33) = -1.95$, $p = 0.054$, and age, $t(201) = 1.94$, $p = 0.054$. Yet, participants that did not complete measurements at T2 reported higher levels of loneliness and depressive symptoms, $t(113.95) = 2.73$, $p = 0.01$ and $t(201) = 2.45$, $p = 0.02$, respectively. Also, a higher proportion of boys compared to girls dropped out, $\chi^2(1) = 10.75$, $p = 0.001$. Given these significant differences for multiple study variables, logistic regression analyses were performed to get a better insight into the variables that were dominant predictors of group membership (dropout vs. present at T2). Adding all study variables in the analyses, gender appeared to be the dominant predictor, $B = 1.103$, $S.E. = .35$, with a Wald statistic of $\chi^2(1) = 9.98$, $p < .01$. All other variables had a Wald statistic that was nonsignificant at the .05 level.

Procedure

Six schools were contacted of which three effectively took part in the study: two secondary schools in Flanders, the Dutch-speaking part of Belgium, and one secondary school in Belgium's capital region of Brussels. Students from grades 11 and 12 were informed about the study and invited by email to participate in the research. This mail message stated that their participation would be rewarded with snacks after participation and that a number of gift vouchers would be raffled after the second participation, that is, five vouchers of 10 Euro and one voucher of 50 Euro (i.e., roughly 11 US \$ and 56 US \$, respectively) per 100 participants. Data was collected using paper and pencil questionnaires at two points in time with an interval of three months. In order to guarantee anonymity, participants were only asked to enter the first letter of their first name and surname as well as their date of birth. With this data we could generate an individual code to link the data of both test moments. All instruments were filled out either in class groups during regularly scheduled classes or in larger groups (i.e., several classes combined) in lunchrooms during an afternoon break. Students had to sign an informed consent form before they completed the questionnaires. As the students were at least 16 years old, parental permission was not required for participation. The study was approved by the Social and Ethical Commission (SMEC) of KU Leuven.

Instruments

Perseverative Thinking Questionnaire – Child version (PTQ-C). The PTQ-C (19) is an adaptation of the Dutch PTQ (20, 21) for use in youngsters. It is a self-report scale assessing repetitive negative thinking comprising 15 items that are rated using a 5-point scale from 1 (never) to 5 (almost always). Sample items are “The same thoughts keep going through my mind again and again” and “Thoughts come to my mind without me wanting them to”. Cronbach's alpha in the present study was .92 at T1 and .94 at T2.

Roberts UCLA Loneliness Scale (RULS-8). The 8-item short version (22) of the revised UCLA Loneliness Scale (R-ULS; 23) is a self-report scale to assess loneliness. A 5-point Likert scale is used with values ranging from 1 (completely untrue) to 5 (completely true). A sample item reads “I lack companionship”. This short version has shown good reliability and validity in a sample of Dutch-speaking adolescents (24). Cronbach's alpha in the present study was .80 at T1 and .81 at T2.

Social Connectedness Scale – Revised (SCS-R). The SCS-R (14) is a self-report questionnaire assessing social connectedness as a psychological sense of belonging. It comprises 20 items to be rated on a 7-point scale

ranging from 1 (strongly agree) to 7 (strongly disagree). Sample items are “I am able to connect with other people” and “I feel disconnected from the world around me” (reverse item). We used a Dutch version from a study by Smeets et al. (25). However, because this was most likely not an official translation (M. Peters, personal communication, September 25, 2017) we decided to develop an official Dutch version using back-translation. Construction proceeded in three steps. First, a native Dutch speaker with a PhD in English literature with extensive expertise in translation and back-translation of questionnaires compared the Dutch items from Smeets et al. (25) against the original English items. She suggested several revisions, which led us to adapt the wording of 11 items. Second, another native Dutch speaker with a degree in English Linguistics and equally extensive experience with translation and back-translation of questionnaires, who was blind to the original English version, translated our Dutch version back into English. Third and finally, the original author of the scale (Richard M. Lee) evaluated the back-translation. In response to his minor comments and in consultation with the two Dutch-speaking experts we made a final revision to one item. Cronbach's alpha in the present study was .88 at T1 and .90 at T2.

Loneliness and social connectedness typically show a high negative correlation, which makes sense because loneliness is considered an important negative consequence of lack of connectedness. However, loneliness and lack of social connectedness are thought to represent relatively distinct constructs, because the latter remains significantly correlated to the ways in which people appraise the value of their social groups and behave in social situations when controlling for the former (14; Study 2).

Center for Epidemiological Studies Depression Scale (CES-D). The CES-D (26, 27) is a self-report questionnaire assessing the presence of depressive symptoms during the past week. We used the Dutch version by Hooge et al. (28) of the abbreviated 12-item CES-D (29). Items are rated on a 4-point scale ranging from 1 (seldom) to 4 (most of the time or always). Sample items are “During the past week I felt depressed” and “During the past week my sleep was restless”. Due to a clerical error, one item was deleted (i.e., “During the past week, people were unfriendly”). Cronbach's alpha for the resulting 11-item version used in the present study was .80 at T1 and .82 at T2 (which was highly comparable to earlier estimates for the original 12-item version).

Data analysis

Pearson correlations and hierarchical linear regression analyses were conducted in IBM SPSS Statistics 24 to examine cross-sectional and

prospective associations of RNT, loneliness, and social connectedness with depressive symptoms. We also reported partial r^2 as effect size indices for the prospective associations. Such an index is an indication of the strength of the association between a predictor and the dependent variable (i.e., depressive symptoms at T2) when controlled for all other predictors. Values of .0196, .1304, and .2592 indicate small, medium and large effects, respectively (30, 31). As differences were observed on important study variables (i.e., depressive symptoms and loneliness levels) when comparing the group that was present at both time points and the group that dropped out (see above), we only performed analyses on the sample that was present both at T1 and T2. As a result, all analyses described below are based on the group of the 135 participants that were present at both time points.

Results

Descriptive Analyses

Descriptive statistics and intercorrelations are presented in Table 1 and Table 2, respectively. When comparing means and standard deviations of study variables by participants' gender, no significant differences were observed (i.e., all nonsignificant independent samples t -tests).

Strong concurrent correlations were established between depressive symptoms and all predictor variables. Associations between predictor variables and prospective depression were moderate to high. The high negative correlation between loneliness and social connectedness replicates earlier findings (14; Study 2). Age did not significantly correlate with any study variable.

TABLE 1. Means and Standard Deviations of Study Variables for the Total Group and for Males and Females Separately

| Variable | M (SD) All | M (SD) Girls | M (SD) Boys | t-value (df) | Pc25/Pc50/Pc75 |
|----------------------------|---------------|---------------|---------------|---------------------------|-------------------|
| 1. Depressive Symptoms T1 | 9.13 (4.90) | 9.20 (4.96) | 8.85 (4.72) | 0.34 (133) | 6.00/9.00/12.00 |
| 2. RNT T1 | 45.64 (10.80) | 46.18 (10.69) | 43.60 (11.17) | 1.13** (132) | 38.00/46.00/53.00 |
| 3. Loneliness T1 | 1.84 (0.60) | 1.84 (0.58) | 1.88 (0.66) | -0.30 (133) | 1.50/1.75/2.25 |
| 4. Social Connectedness T1 | 4.58 (0.63) | 4.58 (0.63) | 4.57 (0.65) | 0.07 (133) | 4.20/4.65/5.00 |
| 5. Depressive Symptoms T2 | 10.09 (5.48) | 9.88 (5.26) | 10.86 (6.31) | -0.84 (133) | 6.00/9.50/14.00 |
| 6. RNT T2 | 44.40 (11.85) | 44.59 (11.55) | 43.68 (13.12) | 0.36 (133) | 35.00/45.00/52.00 |
| 7. Loneliness T2 | 2.04 (0.67) | 2.03 (0.66) | 2.08 (0.71) | -0.33 (133) | 1.50/2.00/2.38 |
| 8. Social Connectedness T2 | 4.42 (0.72) | 4.47 (0.72) | 4.23 (0.72) | 1.53 (133) | 3.95/4.50/4.90 |
| 9. Age | 17.46 (0.76) | 17.41 (0.68) | 17.63 (1.01) | 1.09 (33.57) ^a | 16.92/17.33/17.92 |

Notes. T1 = Time 1, T2 = Time 2; RNT = Repetitive Negative Thinking; Pc = percentile.

^a t -test adjusted for unequal variances across gender; * $p < .05$; ** $p < .01$; *** $p < .001$

TABLE 2. Intercorrelations Among all Study Variables

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|----------------------------|---------|--------|---------|---------|---------|---------|---------|-----|
| 1. Depressive Symptoms T1 | - | | | | | | | |
| 2. RNT T1 | .50*** | - | | | | | | |
| 3. Loneliness T1 | .65*** | .31*** | - | | | | | |
| 4. Social Connectedness T1 | -.56*** | -.28** | -.77*** | - | | | | |
| 5. Depressive Symptoms T2 | .38*** | .39*** | .26** | -.28** | - | | | |
| 6. RNT T2 | .28** | .69*** | .19* | -.20* | .54*** | - | | |
| 7. Loneliness T2 | .50*** | .33*** | .59*** | -.53*** | .65*** | .36*** | - | |
| 8. Social Connectedness T2 | -.45*** | -.29** | -.55*** | .67*** | -.60*** | -.35*** | -.75*** | - |
| 9. Age | .01 | -.08 | .05 | -.09 | .02 | -.10 | -.11 | .09 |

Notes. T1 = Time 1; T2 = Time 2; RNT = Repetitive Negative Thinking.

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

TABLE 3. Hierarchical Regression Analyses Predicting Time 1 and Time 2 Depressive Symptoms From RNT, Loneliness, and Social Connectedness, Measured at Time 1

| | Depression Time 1 | | | | | Depression Time 2 | | | | |
|----------------------------|-----------------------|--------------|----------|-----------|---------|-----------------------|--------------|----------|-----------|---------|
| | <i>R</i> ² | ΔR^2 | <i>B</i> | <i>SE</i> | β | <i>R</i> ² | ΔR^2 | <i>B</i> | <i>SE</i> | β |
| Step 1 | .26 | .26*** | | | | .21 | .21*** | | | |
| Gender | | | -0.08 | 0.92 | -.01 | | | -1.37 | 1.07 | -.10 |
| Age | | | 0.34 | 0.37 | .07 | | | 0.16 | 0.44 | .03 |
| Depressive symptoms T1 | | | / | / | / | | | 1.34 | 0.50 | .24** |
| RNT T1 | | | 2.49 | 0.37 | .51*** | | | 1.52 | 0.50 | .28** |
| Step 2 | .52 | .27*** | | | | .21 | .01 | | | |
| Gender | | | 0.17 | 0.74 | .01 | | | -1.39 | 1.07 | -.10 |
| Age | | | 0.10 | 0.30 | .02 | | | 0.12 | 0.44 | .02 |
| Depressive symptoms T1 | | | / | / | / | | | 1.25 | 0.63 | .23* |
| RNT T1 | | | 1.61 | 0.32 | .33*** | | | 1.50 | 0.51 | .27** |
| Loneliness T1 | | | 2.29 | 0.47 | .47*** | | | -0.47 | 0.74 | -.09 |
| Social Connectedness T1 | | | -0.50 | 0.47 | -.10 | | | -0.74 | 0.68 | -.13 |
| Step 3 | .54 | .01 | | | | .22 | .01 | | | |
| Gender | | | 0.15 | 0.74 | .01 | | | -1.44 | 1.07 | -.11 |
| Age | | | 0.09 | 0.30 | .02 | | | 0.12 | 0.44 | .02 |
| Depressive symptoms T1 | | | / | / | / | | | 1.24 | 0.64 | .23 |
| RNT T1 | | | 1.64 | 0.32 | .34*** | | | 1.51 | 0.51 | .28** |
| Loneliness T1 | | | 2.11 | 0.48 | .43*** | | | -0.63 | 0.76 | -.11 |
| Social Connectedness T1 | | | -0.65 | 0.48 | -.13 | | | -0.83 | 0.70 | -.15 |
| RNT x Loneliness | | | 0.64 | 0.47 | .12 | | | 0.62 | 0.69 | .10 |
| RNT x Social Connectedness | | | 0.84 | 0.50 | .14 | | | -0.03 | 0.73 | -.01 |

Notes. Regression coefficients indicate results for standardized predictor variables. RNT = Repetitive Negative Thinking; T1 = Time 1; **p* ≤ .05. ***p* < .01. ****p* < .001

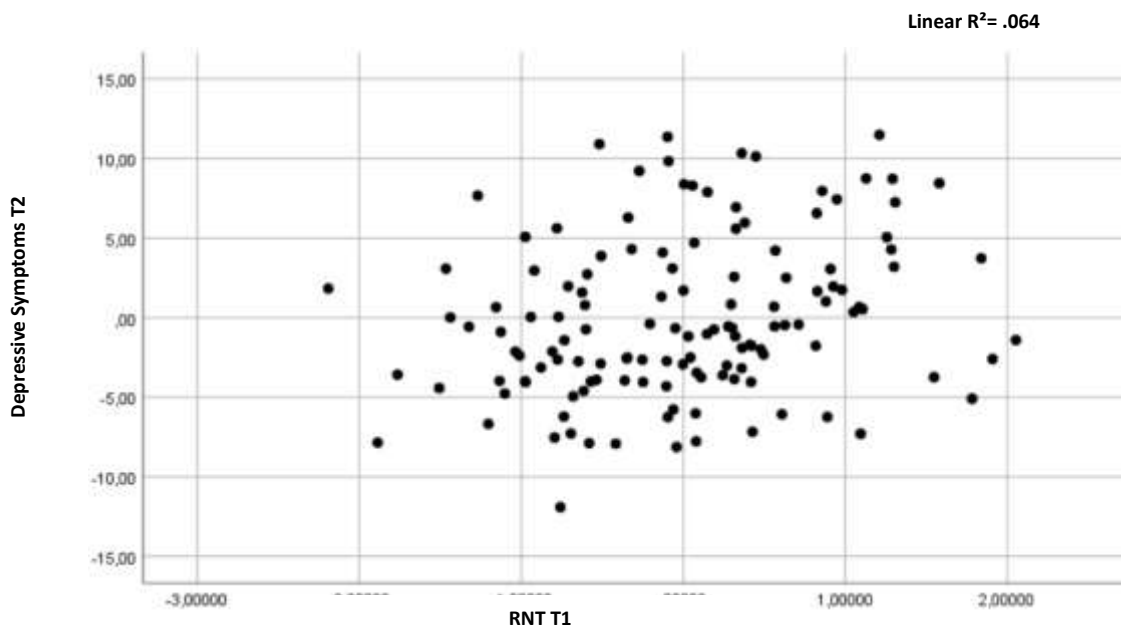


FIGURE 1. Partial Regression Plot for RNT at T1 and Depressive Symptoms at T2, Controlling for Gender, Age, Loneliness, Social Connectedness, RNT X Loneliness, and RNT X Social Connectedness at T1

Regression analyses

Hierarchical regression analyses were performed on both the cross-sectional and the prospective data with depressive symptoms as a criterion variable (Table 3). Predictor variables included RNT (Step 1), loneliness and social connectedness (Step 2), and interactions between RNT and both social context variables (Step 3). For the prospective analyses, T1 depressive symptoms were added to Step 1. Scores on predictor variables were standardized, with the exception of gender, which was coded as 0 (boys) and 1 (girls). The high correlation between loneliness and social connectedness prompted us to compute collinearity statistics. These statistics indicated that no multicollinearity in the data could have biased the regression (Variance Inflation Factor or VIF < 10; tolerance > .10, with a highest VIF and a lowest tolerance value of 3.042 and .329, respectively).

Table 3 shows both RNT and loneliness to be significant positive predictors of concurrent depressive symptoms. Interaction terms did not add significantly to the proportion of explained variance in depressive symptoms, $F(2,128) = 1.50$; $p = .23$. Prospective analyses revealed RNT to positively predict depressive symptom scores, above and beyond baseline depressive symptoms¹. The addition of loneliness and social connectedness did not add significantly to the proportion of variance explained, $F(2,129) = 0.61$; $p = .55$; nor did the inclusion of both interaction terms, $F(2,127) = 0.79$; $p = .50$. Partial r^2 were .066, .005, and .011 for RNT, loneliness and social connectedness, respectively, indicating a small to medium size effect for RNT, whereas the values for the other two variables even fall below the threshold used to identify a small effect (i.e., .0196). A visual representation of the unique association between RNT and prospective symptoms, controlling for all other predictors, can be found in Figure 1.

Discussion

Repetitive Negative Thinking (RNT), or the tendency to frequently and repetitively dwell on worrisome and ruminative thoughts, is a well-established risk factor of emotional problems, such as depression, both in adults and adolescents. The present study set out to examine the relative importance of RNT in the prediction of prospective depressive symptomatology in adolescents. Interpersonal determinants of depression, such as loneliness or social connectedness, were also taken into account to gain insight into the unique predictive value of individual vs. interpersonal/social factors.

Our results first of all confirmed the link between RNT and both cross-sectional and prospective depressive symptoms. Even when controlling for baseline depressive symptoms, RNT significantly

predicted depressive symptoms at follow-up: higher levels of RNT at baseline predicted higher levels of depressive symptoms three months later. Second, when loneliness and social connectedness were entered into the equation, this did not change or weaken the predictive strength of RNT for depressive symptoms. What is even more: loneliness and lack of social connectedness were not significant predictors of prospective depressive symptoms at follow-up. Our results suggest that, in adolescents, RNT may be relatively more important in the context of (prospective) depressive symptoms than interpersonal factors such as loneliness and lack of social connectedness. One could argue that if our sample size had been larger, loneliness and lack of social connectedness might also come out as significant predictors. That is also why we reported effect sizes for the unique contributions of each predictor to the prediction of prospective depressive symptoms. Results were that the effect of RNT could be deemed small to medium, whereas the effects of loneliness and social connectedness did not even reach the threshold needed to be classified as a small effect. Thus, we believe it is fair to state that RNT showed a stronger relationship with prospective depressive symptoms at 3-month follow-up than loneliness and social connectedness (uniquely explaining 6.6% vs 0.5% and 1.1% of the variance).

In terms of clinical implications, our results suggest that RNT would indeed be a justifiable focus for interventions targeting depression in adolescents, be it from a preventive or curative angle. Simply focusing on increasing opportunities for qualitative social interaction, on the other hand, again based on the current findings, may be relatively less likely to yield significant gains in reducing or preventing depressive symptoms, compared to when RNT would be the target. This is in some way reminding of the literature on interventions to reduce loneliness where it is found that interventions that address maladaptive cognitions have larger effects compared to interventions that address social skills or increase opportunities for social interaction (34).

The fact that loneliness did not predict prospective depression was surprising, given that in some previous studies it did predict levels of and increases in symptoms of depression in adolescents (e.g., 15). Even when RNT was left out of the regression analysis, loneliness was still not significantly related to prospective levels of depression in the current study, $\beta = -.09$, $p = .51$. One potential reason for why we failed to replicate the effect of loneliness on prospective symptoms of depression might be the follow-up time window used in the current study (also see 15; 35). An interval of 3 months might be too short for such a variable to have an effect on (and explain variance in) a relatively stable outcome

variable such as depressive symptoms. Future studies, therefore, should include longer follow-ups to examine whether the predictive power of RNT vs. loneliness would differ depending on the length of the time-window. On the other hand, RNT as a trait, is also quite stable, and yet did predict prospective depressive symptomatology, here and in other studies with short (and long) follow-ups. For example, test-retest coefficients are fairly comparable for the PTQ (the measure used for RNT) and the RULS-8 (our measure of loneliness) (see, e.g., 21, 36).

Another additional reason for the non-replication of the prospective effect of loneliness might be related to the particular sample we used. Our sample consisted of adolescents from just a handful of classes from only three schools. One could then imagine that levels of loneliness and connectedness, which are related to the interpersonal or social arena of our participants, would vary less across adolescents from the same class and/or school. For RNT, on the other hand, being more of an intrapersonal factor, there was likely more variation across our participants, as this variable can be expected to be less tied to the social context in which they operate. Any variation in depressive symptoms in our specific sample would thus be more likely explained by individual differences in such an intrapersonal factor as RNT than by differences in levels of interpersonal factors, given that our participants stemmed from only three schools. Thus, future studies need to sample adolescents not via schools or at least from a greater number or variety of classes and schools.

Our study had a number of limitations that need to be taken into account. First, all measures were self-report questionnaires, which means that shared method variance may have affected the validity and reliability of our results. Second, drop-out effects were noticeable in the current study, such that participants who dropped out reported higher depressive symptoms and higher loneliness levels compared to those who did not drop out. Making use of participants only being present at both time points may therefore limit the generalizability of the reported findings and future studies could benefit from including a sample with a larger range of scores on study values. Third, future research will need to examine to what extent our findings on the relative predictive power of RNT vs. loneliness in the context of depression also generalize to more clinical samples. Finally, one item was missing from the depression scale we used.

To conclude, and notwithstanding these limitations, the results of the present study add to the growing body of evidence linking RNT to prospective depression, also in youngsters. As such, this study further underscores the salient role of

RNT for depression risk and preventive interventions in adolescents, just as in adults. Our results also suggest that, in the context of depression, RNT may be relatively more important than factors in the interpersonal or social context such as loneliness or (lack of) feeling socially connected, but future studies in larger and more diverse samples are required to confirm this and to assess how robust this pattern is.

Clinical Significance

In terms of clinical implications, our results suggest that RNT would be a justifiable focus for interventions targeting depression in adolescents, be it from a preventive or curative angle. Simply focusing on increasing opportunities for qualitative social interaction, on the other hand, might be, again based on the current findings, relatively less likely to yield significant gains in reducing or preventing depressive symptoms compared to when RNT would be the target. This hypothesis, however, remains to be tested.

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Conflicts of interest

The authors declare no conflicts of interest.

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Footnote

When checking normality in our data making use of the z-value as described by Kim (37), the two variables loneliness and social connectedness at baseline pointed towards non normality. Because of this, the corresponding variables were transformed using a log transformation for loneliness (positive skew with a z-value of 3.62) and the reverse score log transformation for social connectedness (negative skew with a z-value of -3.56). Normality was checked and approved for the transformed variables. By means of sensitivity analyses, regression analyses were performed once more using the transformed variables. All conclusions remained the same, with the exception of one finding in the prospective analyses: in the final model, baseline depressive symptoms reached significance at the .05 level in the prediction of prospective symptoms.