Breaking the Cycle: Exploring the Bidirectional Associations of Loneliness and Rejection Sensitivity Among First-Year Belgian College Students

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Abstract

Using a three-wave longitudinal design, the present study investigated the bidirectional associations between loneliness and rejection sensitivity. In line with previous empirical data, rejection sensitivity was hypothesized to be positively associated with increased feelings of loneliness at a subsequent measurement wave and vice versa. The sample consisted of 229 Belgian first-year college students (M = 18.3 years, SD = 1.13, 90.8% female). Participants completed the short-form UCLA Loneliness scale (RULS-8) and the Rejection Sensitivity Questionnaire across three measurement waves with a two-month interval. A Random Intercept Cross-Lagged Panel Model demonstrated that individuals who reported consistently higher levels of loneliness also tended to report consistently higher levels of rejection sensitivity, suggesting a significant between-person association between these variables. However, no significant within-person cross-lagged effects were found. These results suggest that, within the study's timeframe, the association between loneliness and rejection sensitivity in college students is primarily a stable, trait-like characteristic rather than a dynamic, fluctuating state. Although the exact nature of their impact on each other remains uncertain, the findings from this study can help policymakers identify who is more likely to experience loneliness and create interventions based on this information, such as addressing maladaptive thought patterns.

Keywords. Loneliness, Rejection Sensitivity, College Students, Random Intercept Cross-Lagged Panel Model, Within-Person Effects, Between-Person Effects

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Rejection Sensitivity Among First-Year Belgian College Students

Loneliness is a distressing emotional state that arises from perceived social isolation. Individuals experience discrepancies between their current social connections and those they desire (Russell et al., 1980). Loneliness is a significant issue in the Western world, especially among young adults and students. For instance, 4.7% of Belgians aged 16-24 felt lonely most or all the time during the past three months (Statbel, 2022). Furthermore, Belgian students claim to experience loneliness during their student life: sometimes (46.1%), often (25.4%), or always (3.1%) ("Drie kwart van de," 2022). Loneliness considerably impacts young adults' mental health, contributing to adverse outcomes such as depression, increased mortality, substance abuse, and reduced employability (Bryan et al., 2024; Horigian et al., 2021; Lara et al., 2020; Xiao et al., 2023), underscoring the need for strong social connections (Arnett, 2000). A susceptible period for experiencing loneliness is the transition from secondary education to college. This transition can leave young adults feeling lonely due to changes in their social circle and newfound autonomy (Scales et al., 2015).

While the detrimental effects of loneliness on mental health and well-being are widely acknowledged, its cognitive implications are equally important. According to the Reaffiliation Motive (RAM) model by Qualter et al. (2015), loneliness can disrupt the cognitive reaffiliation process, leading individuals to develop cognitive biases. Cognitive biases interfere with people's perception of social interactions and are closely related to rejection sensitivity. Individuals with rejection sensitivity tend to interpret ambiguous social interactions as signs of rejection (Downey & Feldman, 1996). Loneliness can impact the cognitions inherent in rejection sensitivity, turning these feelings into prolonged loneliness (Qualter et al., 2015). However, the Social Information Processing (SIP) theory argues that rejection sensitivity contributes to the development of loneliness (Salancik & Pfeffer, 1978).

Individuals sensitive to rejection view social cues in a biased way, perceiving rejection where there is none, leading to social withdrawal and loneliness (Watson & Nesdale, 2012; Zimmer-Gembeck & Nesdale, 2013).

Understanding these cognitive mechanisms in young adults is essential, especially regarding the directionality of loneliness and rejection sensitivity. Although longitudinal studies have explored this relationship, many have examined only one direction, focusing either on the impact of loneliness on rejection sensitivity or vice versa (Cacioppo & Hawkley, 2009; Gao et al., 2017; Qualter et al., 2013; London et al., 2007). While offering valuable insights into the link between the two variables, these studies provide an incomplete understanding of the bidirectionality between the two. Moreover, multiple reviews call for exploring the bidirectionality of these concepts over time because they propose that, most likely, a reciprocal relationship exists between loneliness and rejection sensitivity (Heinrich & Gullone, 2006; Spithoven et al., 2017). A study on schoolchildren explored this bidirectionality but only across two data waves (Zhou et al., 2018). Bidirectionality refers to the mutual influence between two variables, suggesting that changes in one variable can cause changes in another variable and vice versa (Gottman & Ringland, 1981).

On top of this, most studies focus on children and adolescents, and there is a lack of research on first-year college students, a group that is more vulnerable to loneliness than students beyond their initial year of college (Hysing et al., 2020). The present study will longitudinally investigate loneliness and rejection sensitivity by separating between-person and within-person effects, allowing for a deeper understanding of how these constructs fluctuate over time and how they are related. Therefore, the present study aims to answer the following question: *What is the directionality of the association between rejection sensitivity and loneliness among Belgian first-year college students?*

Understanding this directionality aids in interventions targeting rejection sensitivity, loneliness, or both. Effective interventions are necessary to improve social functioning and mental health (Colizzi et al., 2020). As the directionality has yet to be determined, it remains unclear which intervention would be most effective. If rejection sensitivity precedes loneliness, research suggests that addressing negative thought patterns may reduce loneliness more than just increasing social interaction (Masi et al., 2011). Conversely, if loneliness precedes rejection sensitivity, interventions should aim at addressing loneliness as a primary factor to prevent and hinder the development of rejection sensitivity.

Loneliness as an Adaptive Function

Loneliness is a natural experience that serves an evolutionary purpose by motivating individuals to reconnect with others (Perlman & Peplau, 1981). Qualter et al. (2015) explain this adaptive function of loneliness through their Reaffiliation Motive (RAM) model. They argue that loneliness can trigger a self-defense mechanism in individuals, causing them to withdraw from social situations temporarily. This mechanism is followed by a cognitive process of reflection and a search for healthier ways to reconnect. Lonely individuals then regulate their behavior to facilitate reconnection with others. In other words, loneliness is a common and natural human emotion, with an evolutionary function to maintain social relationships and motivation to reconnect. However, loneliness can also lead to cognitive biases during social situations due to a malfunction in the cognitive reaffiliation process (Qualter et al., 2015).

Cognitive Biases

A cognitive bias is a tendency to make irrational decisions or judgments that deviate from logical reasoning. The purpose of a bias is often to simplify complex information

(Korteling & Toet, 2022). Experiencing a cognitive bias can affect decision-making and reasoning abilities by causing errors, false perceptions, and misinterpretations of social information (Kahneman, 2011). Rejection sensitivity can be defined as experiencing cognitive biases, characterized by interpreting neutral or even positive social interactions as evidence of rejection (Downey & Feldman, 1996). In other words, individuals sensitive to rejection display cognitive biases in their interpretations of social interactions, judging ambiguous cues as signs of rejection. Rejection sensitivity significantly shapes individuals' thoughts, emotions, and behaviors in social situations (Marston et al., 2010; Schaan et al., 2020). For example, constantly anticipating rejection can lead to heightened stress, anxiety, aggression, and depression (Liu et al., 2014; London et al., 2007). This bias can also manifest behaviors like avoiding social situations, hindering meaningful connections, and triggering loneliness (Watson & Nesdale, 2012).

Loneliness as a Precursor to Rejection Sensitivity

As mentioned above, loneliness can trigger cognitive biases. Qualter et al. (2015) theorize this in the RAM model, where loneliness can lead to a malfunction in the cognitive reaffiliation process. During this malfunction, one develops cognitive biases, such as those underlying rejection sensitivity. Imagine a lonely individual who faces a neutral social encounter. Their response could be to internalize the experience, thinking, "They do not actively include me in the conversation, so they must not like me." Conversely, when encountering positive interactions, one may attribute this interaction to external and unstable factors, such as "They were only being nice because they feel sorry for me" (Maes et al., 2020; Vanhalst, 2015). This thought pattern then elicits behaviors from others that validate the individual's perceptions of disconnection, consequently reinforcing their feelings of loneliness (Qualter et al., 2015).

Research shows that loneliness poses a significant risk to overall cognitive performance, increased negativity, and a heightened sensitivity to rejection (Cacioppo & Hawkley, 2009). A longitudinal study found that lonely children anticipate rejection more often than non-lonely children (Qualter et al., 2013). Furthermore, a review found that lonely individuals have cognitive biases when processing social information, such as expecting rejection (Spithoven et al., 2017). Together, these studies suggest that loneliness can predict rejection sensitivity, where feelings of loneliness can lead to developing this cognitive bias.

Rejection Sensitivity as a Precursor to Loneliness

However, it remains unclear whether loneliness solely predicts rejection sensitivity or whether loneliness could also be a consequence of rejection sensitivity. In this regard, the Social Information Processing theory suggests that individuals might interpret social cues and generate responses differently based on their sensitivity to rejection. The theory states that individuals actively interpret social cues and create responses based on their experiences and it may lead them to perceive rejection where it may not exist (Salancik & Pfeffer, 1978; Zimmer-Gembeck & Nesdale, 2013). This cognitive bias influences social behaviors, eventually leading to social withdrawal and loneliness (Watson & Nesdale, 2012). The Rejection Sensitivity model suggests that an individual's hypersensitivity to rejection stems from experiences of rejection. This heightened sensitivity lowers the threshold for perceiving negativity, causing individuals to personalize negative cues and experience emotional reactions like hostility, isolation, or loneliness. This establishes a self-fulfilling prophecy, where the individuals' behavior elicits further rejection, reinforcing sensitivity and their reactions to it (Downey & Feldman, 1996).

In a longitudinal study on young adolescents, anxious and angry expectations of rejection predicted increased loneliness over time (London et al., 2007). Furthermore, a meta-

analysis indicated that higher rejection sensitivity at baseline predicted increased loneliness at follow-up (Gao et al., 2017). Consequently, this implies that loneliness could result from rejection sensitivity, where biased interpretations of social cues lead to loneliness. Interestingly, a longitudinal study of Chinese adolescents investigated the bidirectionality of rejection sensitivity and loneliness. It was found that rejection sensitivity at baseline led to an increase in their feelings of loneliness one year later. However, baseline loneliness did not increase their rejection sensitivity one year later (Zhou et al., 2018).

The Present Study

Despite these studies, the directional relationship between loneliness and rejection sensitivity is yet to be firmly established. As discussed above, several studies have used longitudinal designs to show that loneliness could lead to cognitive biases, such as increased sensitivity to rejection (Cacioppo & Hawkley, 2009; Qualter et al., 2013; Spithoven et al., 2017). On the other hand, other longitudinal studies have found that individuals sensitive to rejection tend to avoid social interactions, thus increasing their level of loneliness (Gao et al., 2017; London et al., 2007). Together, these studies suggest that, most likely, a reciprocal relationship between loneliness and rejection sensitivity exists. Analyzing both directions can better infer the potential influences they may exert on each other and define the dominant predictor in the reciprocal relationship. One study analyzed the bidirectional relationship between loneliness and rejection sensitivity, documenting that rejection sensitivity might be the stronger predictor. It is worth noting, however, that this study only included two data collection waves, limiting the ability to accurately determine the relationship's directionality (Zhou et al., 2018).

The present study assesses both variables across three measurement waves. Multiple waves clarify the directionality of loneliness and rejection sensitivity and whether/how each

factor contributes to the development and consequences of the other. Thus, it is an investigation of bidirectionality. In longitudinal studies, separating between-person and within-person effects is essential to answer the research question correctly. Between-person effects refer to stable differences among individuals, whereas within-person effects analyze fluctuations within individuals over time. This differentiation can produce more precise interpretations about the nature and direction of the association (Hamaker et al., 2015).

Thus, on a within-person level, it is hypothesized that higher levels of rejection sensitivity in college students in Wave 1 will be positively associated with increased feelings of loneliness in Wave 2 (H1a). This positive association is also expected between rejection sensitivity in Wave 2 and loneliness in Wave 3 (H1b). See the yellow line in Figure 1. Likewise, higher levels of loneliness in college students in Wave 1 will be positively associated with increased rejection sensitivity in Wave 2 (H2a). This positive association is also expected between loneliness in Wave 2 and rejection sensitivity in Wave 3 (H2b). See the blue line in Figure 1. Moreover, based on the bidirectional longitudinal study by Zhou et al. (2018), it is also hypothesized that rejection sensitivity in Wave 1 is a stronger predictor for loneliness at subsequent waves than loneliness in Wave 1 for rejection sensitivity at subsequent waves (H3).

Figure 1

Conceptual Model of the Present Study
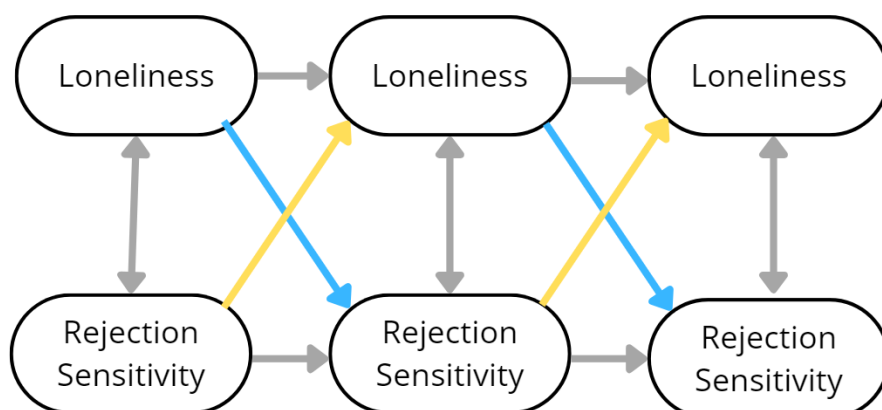
Methods

Participants

Participants were first-year psychology students from KU Leuven, as part of the Collective Testing series, where first-year psychology students participated in research to receive course credits. Students were surveyed three times once every two months. The first measurement wave occurred within a couple of weeks after the start of the first semester. Data collection ran from October 2014 to February 2015. At the baseline (Wave 1) assessment, participants included 373 students (82.8% females). The mean age of the sample at baseline was 18.4 years ($SD = 1.25$), with a range of 17-25 years. Data from 12 students were excluded because they were older than 25 years old. 45.9% of the participants were from middle-income families with a mother who had earned at least a college degree. At the Wave 2 assessment, 283 participants were retained; at the Wave 3 assessment, 279 participants were retained.

An attrition analysis revealed that 229 participants completed Wave 1 through 3 (active group), and 144 participants missed at least one data collection wave (dropout group). A Mann-Whitney U test revealed significant differences between the active and dropout groups in terms of age ($p < .001$) and gender distribution ($p < .001$). The active group tended to be younger, with a mean age of 18.3 compared to 18.7 for the dropout group. However, the rank-biserial correlation for the age difference was -.24, suggesting a small effect. The active group also had a significantly higher proportion of females (90.8%) than the dropout group (70.1%). However, the rank-biserial correlation was .21, suggesting a small effect. This indicates that the gender and age distribution, although significantly different, is not vastly dissimilar between the two groups. The final sample comprised 229 participants ($M = 18.3$ years, $SD = 1.13$, 90.8% female).

Procedure

Ethical approval was obtained from the Sociaal-Maatschappelijke Ethische Commissie from the KU Leuven in Belgium before the commencement of the study (#S55942). A self-report instrument was administered to participants through an online survey environment. Each student was assigned a specific Electronic Management System (EMS) code to protect their identity and enable their tracking across waves. The researchers could not infer the student's identity based on this EMS code. The students were informed of the characteristics of the survey through an informed consent form. The form contained information that participation in the study was voluntary, that they could quit at any time without consequence, and that their responses would be treated with privacy and confidentiality. Participants were offered two choices: 1) "Yes, I confirm that I have read and understand the information and that I am voluntarily participating in this study" or 2) "No, I will not participate in this study." Clicking the first choice was considered a "signature" or acceptance of the informed consent. They were then automatically redirected to the online environment, where they could complete the survey. On each online survey page, including the informed consent page, participants could click a button saying, "I no longer wish to participate; please erase my answers."

Measures

Several demographic variables were asked, such as gender (coded as male = 1, female = 2), age (in years), and the highest educational degree their mother obtained (as an indicator of socioeconomic status, SES).

Loneliness

Participants completed the Roberts UCLA Loneliness Scale (RULS-8; Roberts et al., 1993) in W1, W2 and W3. The eight scale items could be answered on a 6-point Likert scale ranging from completely correct (1) to completely incorrect (6). Example items are: "I lack companionship" and "I do not feel closely connected to anyone anymore." Four items were reversed coded. The validity of the RULS-8 is considered good (Goossens et al., 2014). In this study, the reliability of the RULS-8, as indicated by Cronbach's alpha, was .86 to .87 across the three waves. The average interitem correlation ranged from .45 to .47, and the reliability did not substantially improve when dropping any individual item in any wave. For each wave, the score on each item was averaged to compute a mean score of loneliness, with higher scores indicating more loneliness.

Rejection Sensitivity

Participants completed the Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996) in W1, W2, and W3. The instrument consists of 18 items and asks participants to indicate their degree of concern about a situation's outcome on a 6-point Likert scale ranging from very unconcerned (1) to very concerned (6). Example items are: "You ask your partner to move in together" and "You ask your parents for extra money for daily expenses." They are then asked to indicate the likelihood that the other person(s) would respond in an accepting fashion on a 6-point Likert scale ranging from very unlikely (1) to very likely (6). The high likelihood of this outcome represents expectations of acceptance, and the low likelihood represents expectations of rejection.

First, reverse scoring was applied to the scores on the items representing expectations of acceptance, ensuring that higher scores now reflect expectations of rejection. The reversed score was then multiplied by the score for the degree of concern, allowing for the computation of a rejection sensitivity score for each item. Second, each participant's total

rejection sensitivity score was computed by calculating the mean across all items per wave, with higher scores indicating more rejection sensitivity. The validity of the RSQ is considered good (Downey & Feldman, 1996). The reliability of the RSQ, as indicated by Cronbach's alpha, ranged from .91 to .94 across the three waves. The average interitem correlation ranged from .21 to .30, and the reliability did not substantially improve when dropping any individual item.

Data Analysis

Data Preparation and Cleaning

First, for all waves, descriptives (means, standard deviations, minimum, maximum, and frequencies) and correlations were computed for age, gender, SES, loneliness, and rejection sensitivity. Four items in the RULS-8 and 18 items in the RSQ were then recoded to make all items go in the same direction and to make interpretation more logical. Moreover, the scales' reliability was determined by computing Cronbach's alpha. Lastly, mean variables for the scales were created, and the validity of each scale was checked (see Measures).

Mean imputation was used to address the missing values in the data, allowing for the most efficient utilization of the available data. Mean imputation calculates the mean of available data and substitutes missing values accordingly (Engels & Diehr, 2003). All participant's responses on each scale were manually checked. If a participant had two or more missing values on the RULS-8 and/or four or more missing values on the RSQ, the calculated mean was excluded to maintain the accuracy of the data. This resulted in manually deleting one RSQ mean computation in W2 and three mean computations in W3. This was done using JASP (Version 0.18.3).

Random Intercepts Cross-Lagged Panel Model

To assess the associations between rejection sensitivity and loneliness across three data collection waves, the Random Intercepts Cross-Lagged Panel Model (RI-CLPM; Hamaker et al., 2015) was used (see Figure 2). This was done using software R (Version 4.3.3). Using the RI-CLPM requires at least three data waves, with an equal interval between waves 1 and 2 as between waves 2 and 3. These assumptions were met within the current dataset.

The RI-CLPM is an extension of traditional cross-lagged panel models that account for individual differences in loneliness and rejection sensitivity. This extension significantly advances the understanding of the relationship between two constructs. Unlike traditional cross-lagged models, the RI-CLPM accounts for both stable individual differences (between-person effects) and temporal fluctuations within individuals (within-person effects). The RI-CLPM recognizes that each person has a trait-like level of loneliness and rejection sensitivity, represented by random intercepts. This trait-like level acts as a personal average, unique to each participant. On top of this trait-like level, there are fluctuations over time, representing how a person's loneliness and rejection sensitivity might vary in response to situations they encounter. It thus provides a more nuanced and accurate picture of how these constructs interact.

The random intercepts indicate the between-person variability in all measures. The observed loneliness and rejection sensitivity scores at W1, W2, and W3 are the indicators for these random intercepts. This results in one random intercept included for each measure (two in total), with all factor loadings constrained to 1. Examining the association between these intercepts uncovers the between-person trait-like association between these two constructs, independent of within-person fluctuations.

Moreover, a latent factor is defined for each construct across all time points to implement the assumption of the within-person varying parts. When each observed score is

regressed on its latent factor, it indicates the deviations within a person at each time point from the random intercept. This results in six latent factors, i.e., one for loneliness and one for rejection sensitivity at each of the three measurement waves. Examining the relationship between these latent factors uncovers how changes in loneliness relate to changes in rejection sensitivity at the same time point (within-time associations) and across different time points (cross-lagged effects). The model also allows for estimating carry-over effects, which capture the stability of participants' past scores on future scores.

Model Comparison and Hypothesis Testing

Two models were tested and compared. In the first model, the error variances of the observed scores were constrained to zero, ensuring that the structures of latent factors in the within-person and between-person paths entirely captured all variation in the observed measures. This constrained model facilitated the examination of whether the within-time associations, cross-lagged paths, and carry-over paths followed consistent patterns. This model was compared to a second, entirely unconstrained model, where the error variances of the observed scores could vary freely without constraints. The fit of both models was assessed with the Comparative Fit Index (CFI > .90 = acceptable), the Root Mean Square Error of Approximation (RMSEA < .06 = acceptable), and the Standardized Root Mean Square Residual (SRMR < .08 = good fit). Chi-square difference tests were computed to compare both models to find the best fit. Then, the intraclass correlations (ICCs) for loneliness and rejection sensitivity were calculated to indicate the variance that could be explained by these stable trait-like levels versus the variance explained by within-time fluctuations. Thus, the ICCs represent, per variable, the proportion of between-person variance and the within-person variance (Masselink et al., 2018).

Finally, hypotheses were tested by examining the significance and direction of the cross-lagged effects through parameter estimates of the best-fitting model. Standardized coefficient p-values for cross-lagged paths were analyzed to test hypotheses 1a, 1b, 2a, and 2b. Standardized coefficients and p-values were then compared to determine the stronger predictor for hypothesis 3. Path coefficients with *p*-values below .05 were considered statistically significant.

Figure 2

The Random Intercept Cross-Lagged Model
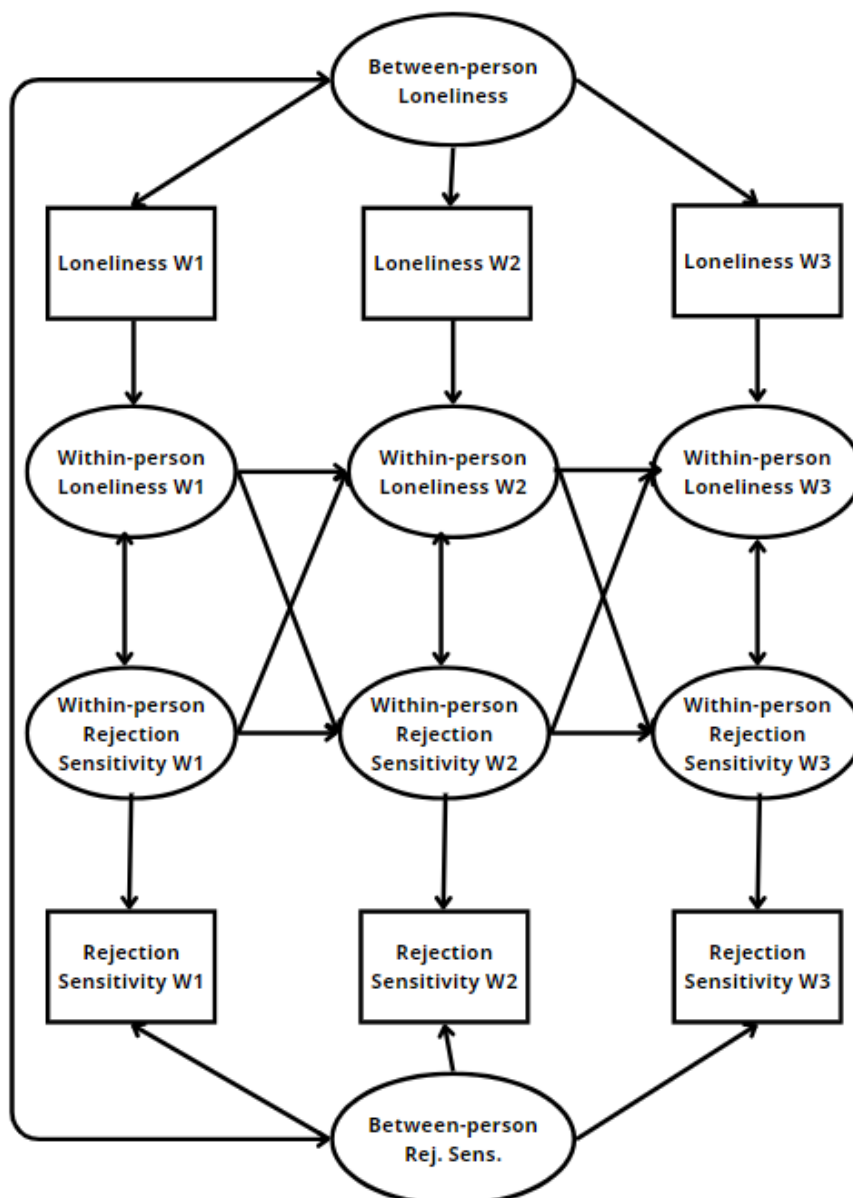
Results

Descriptives

Table 1 summarizes the correlations, means, standard deviations, minimums, and maximums for loneliness and rejection sensitivity across the three measurement waves. The high correlations between loneliness at W1, W2, and W3 indicate that individuals who experience loneliness in one wave also experience loneliness in another wave. This is also the case for rejection sensitivity. Furthermore, the moderate positive correlations between rejection sensitivity and loneliness across different measurement waves imply that rejection sensitivity could contribute to loneliness and vice versa.

Interestingly, the study found no significant correlations between age, gender, and SES with either loneliness or rejection sensitivity, suggesting that these factors do not significantly influence these variables. The only exception was a negative correlation between gender and loneliness in one wave, indicating that men might experience slightly higher loneliness levels than women, but this was a weak correlation.

Table 1

Descriptive Statistics and Correlations Between all Study Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Age		-0.23***	-0.04	0.06	0.09	0.04	-0.09	-0.04	-0.04
2. Gender			0.03	-0.01	-0.08	-0.13*	0.13	0.08	0.01
3. SES				-0.10	0.04	-0.05	0.00	0.02	-0.02
4. Loneliness W1					0.73***	0.67***	0.46***	0.46***	0.50***
5. Loneliness W2						0.78***	0.41***	0.49***	0.51***
6. Loneliness W3							0.35***	0.44***	0.48***
7. Rejection Sensitivity W1								0.80***	0.77***
8. Rejection Sensitivity W2									0.87***
9. Rejection Sensitivity W3									
N	373	373	355	354	283	279	353	283	276
M	18.4	1.8	3.0	2.4	2.1	2.2	9.4	8.8	8.5
SD	1.3	0.4	0.4	0.9	0.8	0.8	3.9	3.6	3.9
Min	17.00	1.00	1.00	1.00	1.00	1.00	1.17	1.44	1.44
Max	25.00	2.00	5.00	5.88	4.75	5.00	27.28	23.56	24.61

Note. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3. * $p < .05$. **p < .01. ***p < .001.

Model fit

Two models were tested and compared to determine the most suitable model for the

data. Table 2 shows the model fit of the unconstrained and constrained RI-CLPM models and

the model comparison. When comparing the fit of two models, the one with the lowest

RMSEA and SRMR and highest CFI is preferred (Hu & Bentler, 1999). Additionally, a

significant χ^2-difference test indicates that the models differ. Although the RMSEA of the

constrained model is lower, the CFI and SRMR in the unconstrained model are higher and

lower, respectively. Thus, the unconstrained model was preferred over the constrained model

and was subsequently chosen to investigate the between-person and within-person

associations.

Table 2

Model Fit Indices for the Unconstrained and Constrained RI-CLPM Models

	Model	
Indices	Unconstrained	Constrained
$\chi^2(df)$	9.74 (1)	88.15 (12)
CFI	0.99	0.93
RMSEA	0.20	0.17
SRMR	0.04	0.09
p	< .001	

Note. χ^2 = chi-square, *df* = degrees of freedom, CFI = comparative fit index,

RMSEA = root-mean-square error of approximation, SRMR = standardized

root-mean-square-residual, p = *p*-value of chi-square difference test.

Intraclass Correlation Coefficients

The Intraclass Correlation Coefficients (ICCs) for loneliness and rejection sensitivity

provide insights into the sources of variability in these measures. The ICC for loneliness, at

71.9%, indicates that most of the variance in loneliness scores is attributed to differences

between participants rather than fluctuations within the same participant over time. This

suggests that participants generally maintain consistent levels of loneliness across different measurement points. Similarly, the ICC for rejection sensitivity, at 80.7%, reveals that most of the variance in rejection sensitivity scores is due to differences between individuals. This suggests that individuals consistently demonstrate similar levels of sensitivity to rejection over time.

Between-Person and Within-Person Associations

The analysis separated between-person and within-person effects to examine the relationship between loneliness and rejection sensitivity across three measurement waves (W1, W2, W3). Within-person effects were further divided into within-time associations, carry-over stability paths, and cross-lagged effects.

The between-person association, indicated by the random intercepts, was large and positive. This indicates that participants with higher loneliness scores across the three measurement waves reported more rejection sensitivity across the same three measurement waves than participants with relatively low loneliness, and vice versa.

On the within-person level, moderate significant positive concurrent associations were found between loneliness and rejection sensitivity in W1. This indicates that participants who scored higher or lower than their expected loneliness score also tended to score higher or lower than their expected rejection sensitivity score in W1. However, this was not the case for W2 and W3, meaning participants whose loneliness score changed from one wave to another did not exhibit consistent changes in rejection sensitivity.

No significant carry-over stability paths of loneliness or rejection sensitivity were found. Thus, within-person deviations from the expected loneliness and rejection sensitivity scores did not predict deviations from the expected loneliness and rejection sensitivity scores at the next measurement wave two months later.

Contrary to the initial hypotheses, the within-person cross-lagged effects from loneliness to rejection sensitivity and from rejection sensitivity to loneliness were not significant. This indicates that rejection sensitivity at neither W1 nor W2 predicted loneliness at W2 or W3, respectively. Hypothesis 1a and 1b are thus rejected. Moreover, it indicates that loneliness neither at W1 nor W2 predicted rejection sensitivity at W2 or W3, respectively. Hypothesis 2a and 2b are thus rejected. Given the absence of significant cross-lagged effects, hypothesis 3, which aimed to identify the stronger predictor in the relationship between loneliness and rejection sensitivity, could not be tested.

Table 3

Parameter Estimates for the Unconstrained RI-CLPM Modelling Loneliness and Rejection Sensitivity

Paths	B	SE (B)	p	95% CI [Lower, Upper]	β
Between-Person Association					
Loneliness – Rejection Sensitivity	1.29	0.16	.000	[0.43, 0.66]	0.54
Within-time Association W1	0.32	0.15	.038	[0.06, 0.53]	0.29
Cross Lagged Effects					
Loneliness – Rejection Sensitivity W1 – W2	0.44	0.42	.317	[-0.17, 0.53]	0.18
Loneliness – Rejection Sensitivity W2 – W3	0.60	0.99	.547	[-0.24, 0.45]	0.10
Rejection Sensitivity – Loneliness W1 – W2	0.02	0.04	.570	[-0.29, 0.54]	0.12
Rejection Sensitivity – Loneliness W2 – W3	0.04	0.05	.490	[-0.28, 0.55]	0.14
Stability Paths					
Loneliness W1 – W2	0.03	0.09	.705	[-0.24, 0.36]	0.06
Loneliness W2 – W3	-0.07	0.40	.856	[-0.68, 0.56]	-0.06
Rejection Sensitivity W1 – W2	-0.056	0.25	.824	[-0.69, 0.55]	-0.07
Rejection Sensitivity W2 – W3	0.362	0.19	.053	[-0.07, 0.64]	0.29
Correlated Change					
Within-time Association W2	0.184	0.16	.259	[-0.13, 0.91]	0.39
Within-time Association W3	0.072	0.09	.438	[-0.15, 0.35]	0.10

Note. W1 = Wave 1, W2 = Wave 2, W3 = Wave 3.

Figure 3

Simplified Random Intercept Cross-Lagged Panel Model With Standardized Coefficients
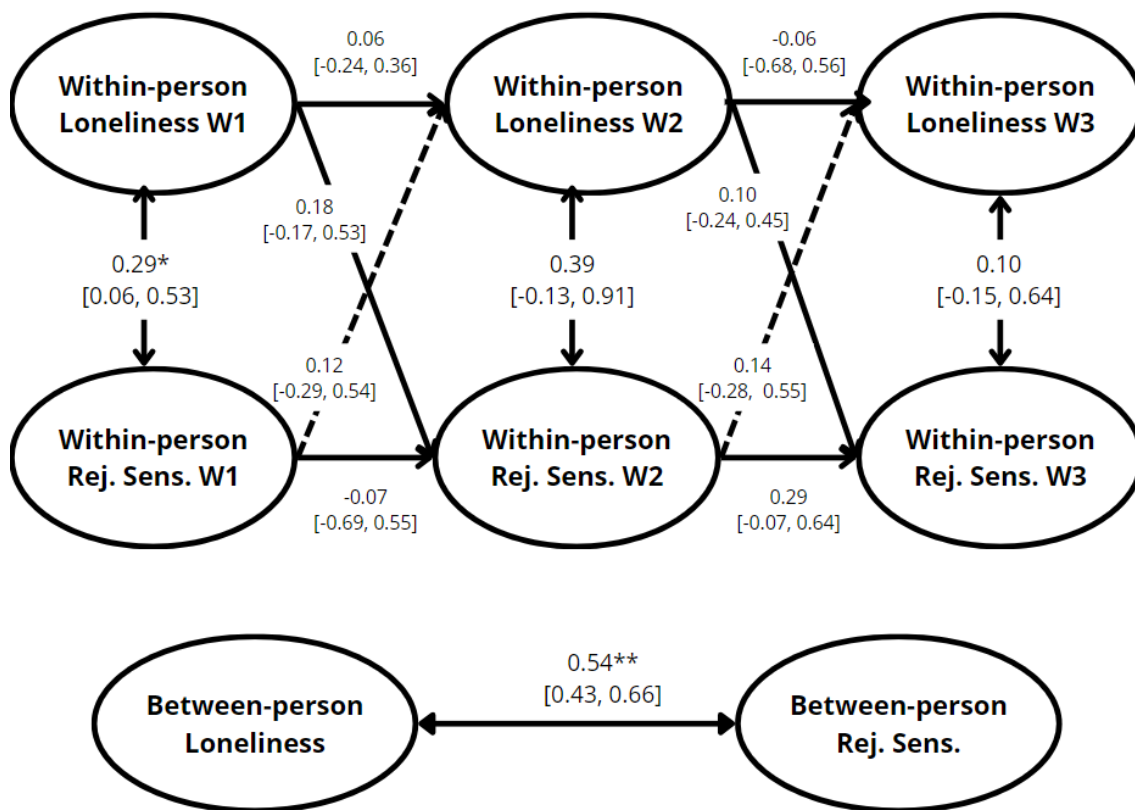
Note. Rej. Sens. = rejection sensitivity; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

*p < .05. **p < .001.

Discussion

The current study examined the bidirectionality of loneliness and rejection sensitivity among Belgian first-year college students by separating between-person and within-person effects, an essential separation not commonly seen in previous research. Separating stable individual differences (between-person) and temporal fluctuations within individuals (within-person) provides a more nuanced and comprehensive understanding of the reciprocal association between loneliness and rejection sensitivity. Not separating these effects may lead to misleading conclusions about the nature and direction of this association (Hamaker, 2023).

In this context, at a within-person level, it was hypothesized that 1) higher levels of rejection sensitivity in college students at one wave would be positively associated with increased feelings of loneliness in a later wave, 2) higher levels of loneliness in college students in one wave would be positively associated with increased rejection sensitivity in a later wave, and 3) rejection sensitivity was a stronger predictor of loneliness than the reverse. However, the current dataset did not find evidence for within-person cross-lagged effects between these two constructs.

The findings of this study challenge previous assumptions regarding the reciprocal association between loneliness and rejection sensitivity. The lack of evidence for cross-lagged effects indicates that individuals who feel lonely at one point do not predict their increased rejection sensitivity at a subsequent point in time or vice versa. These findings appear inconsistent with the results of previous longitudinal studies, although they do not separate between-person and within-person effects, which showed that loneliness could lead to cognitive biases like increased sensitivity to rejection (Cacioppo & Hawkley, 2009; Qualter et al., 2013; Qualter et al., 2015; Spithoven et al., 2017). Other studies found that individuals sensitive to rejection often avoid social interactions, increasing their loneliness (Gao et al., 2017; London et al., 2007; Zhou et al., 2018).

However, a strong positive association between loneliness and rejection sensitivity was found on a between-person level. This finding suggests that college students with high loneliness on average reported more rejection sensitivity on average than college students with low loneliness and vice versa. This suggests that these characteristics are stable to a certain degree for some individuals rather than being fleeting states. A meta-analysis of longitudinal studies on loneliness supports this, indicating that loneliness has trait-like features and that some individuals always feel lonelier than others, irrespective of their current circumstances (Mund et al., 2019). In parallel, a longitudinal study on rejection

sensitivity in late adolescence found rejection sensitivity to remain relatively stable over a 3-year period (Marston et al., 2010).

It's important to note that although this study did not find within-person effects over the two-month period, it does not rule out the possibility that such effects may exist outside the current time frame. The current study might not have captured the time scale needed to understand how changes in rejection sensitivity and loneliness influence each other. It is possible that individual instances of rejection or loneliness might have a more immediate impact on each other. The relative stability of loneliness and rejection sensitivity at the individual level suggests that day-to-day fluctuations in these feelings are likely influenced by specific situations or experiences. If these traits were unstable, we would expect significant within-person changes even over longer durations. However, the fact that they remain relatively consistent at the between-person level suggests that any deviations from this baseline are likely short and event-driven (Curran & Bauer, 2011).

Consider, for instance, an individual who experiences rejection in a social setting. This event could trigger an immediate increase in feelings of loneliness, which could subsequently heighten their rejection sensitivity in anticipation of further rejection and disappear again as the individual recovers from the initial rejection. Recent research indicates that feelings of anxiety, stress, and depression can lead to daily changes in loneliness (Buecker et al., 2023). Additionally, a weekly diary study found that the frequency of socializing with friends was associated with fluctuations in loneliness (Awad et al., 2023). Moreover, a significant temporal relation between emotional distress and perceived rejection was found, where increases in emotional distress were shown to perpetuate perceptions of rejection only 15 minutes later (Heekerens et al., 2022). Together, these studies suggest that loneliness and rejection sensitivity fluctuations are best measured immediately after specific or triggering events. Future studies should, therefore, focus on longitudinal designs with

shorter time intervals between measurement waves. For example, using experience sampling methodology to capture real-time fluctuations (Award et al., 2023; Buecker et al., 2023; Heekerens et al., 2022).

However, while short-term fluctuations in loneliness and rejection sensitivity may be event-driven, the chronic experience of loneliness can fundamentally alter an individual's way of thinking (Hawkley & Cacioppo, 2010). It's important to note that brief, temporary experiences of loneliness, leading to adaptive, short-term processes, differ from loneliness that endures for months or even years (Maes & Vanhalst, 2024). This distinction aligns with the concept of the galloping horse fallacy, which emphasizes that long-term effects are not identical to short-term observations (Frijns et al., 2020). Understanding loneliness's adaptive function necessitates focusing on short-term processes, such as using experience sampling methodology. However, given that long-term loneliness can reshape an individual's way of thinking, it likely also manifests as long-term changes in rejection sensitivity (Vanhalst et al., 2015). Future research on the relationship between loneliness and rejection sensitivity should not only employ experience sampling methodology for capturing short-term effects but also consider longitudinal studies focusing on chronically lonely individuals to investigate how these traits may relate over extended periods, like one-year intervals.

Strengths and Limitations

The present study has several strengths. First, it is the first study to separate between-person and within-person effects in investigating loneliness and rejection sensitivity. Separating these effects in the relationship between loneliness and rejection sensitivity is essential to make proper conclusions about the stability of loneliness and rejection sensitivity and how these traits can vary over time within individuals and between individuals.

Moreover, this longitudinal study tested multiple paths from loneliness and rejection sensitivity with a state-of-the-art statistical analysis.

Despite these strengths, there are some limitations that should be addressed. First, both the unconstrained and constrained RI-CLPM fit were insufficient. This means that the hypothesized model, either with or without restrictions on specific parameters, did not adequately capture the underlying patterns and relationships within the observed data. This is an important limitation because it raises concerns about the statistical power of the study. Insufficient model fit may arise not only from an inaccurate theoretical model but also from a lack of sufficient data to detect the true relationship (Schermelleh-Engel et al., 2003). This could lead to inaccurate or misleading conclusions about the relationship between loneliness and rejection sensitivity (Bentler & Chou, 1987). Future research should consider using larger samples to improve statistical power and potentially achieve better model fit, which could provide a clearer understanding of the dynamics of loneliness and rejection sensitivity.

A second limitation lies in the surveys administered to the participants. While the surveys utilized validated scales, the instructions for answering the items lacked clarity, specifically regarding the response timeframe. Instead of specifying a period such as "the past week" or "the past month," participants were asked to "indicate what suits them best," leaving the timeframe open to interpretation. This ambiguity is problematic as it introduces variability in how participants interpreted and responded to the items, potentially undermining the reliability and validity of the findings (Einola & Alvesson, 2021). The lack of a clear timeframe potentially led to a misalignment between the measurement intervals (two months) and the participants' potentially varying interpretations of the response period, leading to unreliable conclusions about change over time (Hamaker, 2023). Future research should explicitly define the timeframe for survey responses (e.g., aligning with the study's measurement intervals) to ensure consistency and comparability across participants, thus

strengthening the reliability and validity of the study design and enabling a more accurate assessment of within-person fluctuations.

Implications

This research yields significant implications. The current study finds loneliness and rejection sensitivity to be strongly related, although the precise nature of their influence on each other remains uncertain. Given the concerning prevalence of loneliness among young adults and college students, policymakers developing intervention strategies should consider targeted interventions. Specifically, the between-person effects suggest that individuals who generally felt lonelier also tended to feel more sensitive to rejection than those who generally felt less lonely. This finding can inform policymakers that those who are more at risk of experiencing loneliness are individuals who also experience rejection sensitivity. In other words, these findings inform the risk group for loneliness. When developing interventions for lonely individuals, policymakers should know rejection sensitivity is very likely also at play and thus needs to be addressed. This aligns with a meta-analysis by Masi et al. (2019) that revealed interventions targeting maladaptive social cognitions, like heightened rejection sensitivity, were more effective in reducing loneliness than those focused on social support or social skills alone. By addressing rejection sensitivity in lonely individuals, interventions can possibly disrupt the self-perpetuating cycle where negative social expectations and behaviors reinforce feelings of loneliness.

Conclusion

The current study found a strong between-person relationship between loneliness and rejection sensitivity among college students, highlighting the need for targeted interventions. However, no clear within-person effects emerged over the study timeframe. Future research

could benefit from utilizing more frequent measurements like experience sampling to capture

potential short-term fluctuations in these constructs. Nevertheless, these findings offer

valuable insights, emphasizing the importance of separating stable individual differences

from dynamic fluctuations. Ultimately, understanding the relationship between loneliness and

rejection sensitivity is not only valuable for scholars but also a crucial step in empowering

young adults to build fulfilling social connections and thrive in their social and academic

environments.

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Appendix A: Reflection on interdisciplinarity

This thesis investigated the bidirectionality between loneliness and rejection sensitivity among Belgian first-year college students. The discipline of psychology is central to this thesis, as it provides theoretical constructs, definitions, and measurement tools to operationalize the two central constructs. More specifically, this thesis utilized psychological theories such as the Reaffiliation Motive by Qualter et al. (2015) and the Social Information Processing theory (Salancik & Pfeffer, 1978). These theories provide a framework for understanding how young adults perceive, interpret, and respond to social cues and potential rejection, as well as how experiences of loneliness shape an individual's social behavior and subsequent vulnerability to perceived rejection. This thesis aimed to gain a new understanding of the individual differences and cognitive processes contributing to loneliness and rejection sensitivity.

Furthermore, recognizing the heightened vulnerability to loneliness during young adulthood, this thesis specifically focuses on college students. This emphasis draws on the subdiscipline of developmental psychology, which provides context on this age group's unique social and emotional challenges. Developmental psychology is a discipline that focuses on people's change and growth across their lifespan. Significant life events are considered the crucial triggers for this change and growth in life (Kettlewell et al., 2020). In the context of this thesis, the college environment can make students feel alienated from their homes, uncertain about their future, and disconnected from their previous friends and activities. These challenges create opportunities for new emotions and behaviors to emerge, making college students especially susceptible to loneliness. (Diehl et al., 2018).

Monodisciplinary Approach

While integrating psychological and developmental theories created a deeper understanding, this thesis primarily adopts a monodisciplinary approach. This approach is justified as the research question focuses on understanding the relationship between loneliness and rejection sensitivity on an individual level. To clarify, this research distinguishes between and within-person effects. Separating these effects allows for a deeper understanding of how constructs fluctuate over time and how they relate. The hypotheses primarily focused on the within-person level of the study. There is no other way to look at within-person effects without looking at individual processes and variations. This emphasis justifies excluding disciplines such as sociology or anthropology, which typically examine broader societal or cultural factors.

It's worth noting that this study relied on self-report measures of loneliness and rejection sensitivity. Survey respondents needed to employ self-knowledge, also known as introspection, to answer these survey questions, a method often disregarded as faulty and untrustworthy (Schwitzgebel, 2008). However, according to Heinrich and Gullone (2006), it may be difficult for third-party observers to identify lonely individuals based solely on their behavior accurately. This is because their behavior may not always accurately reflect the level of loneliness they are experiencing. Therefore, observation or third-party assessors, methods primarily used in disciplines like behavioral science or anthropology, would be useless. Self-reporting remains the most suitable method for answering this research question.

Stakeholders

Multiple stakeholders outside academia could contribute to deepening the understanding of the bidirectionality of loneliness and rejection sensitivity even more. First, college counselors and mental health professionals' firsthand experiences could provide real-world context for students' loneliness and rejection sensitivity. Because they are in direct

contact with students, they can infer the problems that students encounter when talking about loneliness and rejection sensitivity. These mental health professionals can help researchers contextualize their theories and studies by sharing their insights with researchers. In turn, researchers can create a more informed understanding of the problems that college students are dealing with.

Next, listening to students themselves would be a valuable addition. This thesis relied on quantitative data. While the longitudinal design provided valuable insights into the stability and fluctuation of loneliness and rejection sensitivity over time, incorporating different methodologies, like qualitative designs where the student's experiences are central to the research, could deepen the understanding of loneliness and rejection sensitivity even more. Examples of this are interviews or open-ended survey questions.

Lastly, intervention and policymakers could benefit from this thesis's results and contribute to the practical world. The research suggests that loneliness and rejection sensitivity in college students are more trait-like than fluctuating states. These results inform policymakers who to target in these interventions. For instance, individuals who are at higher risk for loneliness are also at higher risk for rejection sensitivity. This insight informs policymakers that targeted interventions could most effectively address these issues. However, policymakers should keep in mind this thesis's limitations. The fact that no within-person effects were found doesn't mean that they don't exist. Future research is needed to investigate the within-person effects of loneliness and rejection sensitivity, and interventions can then be developed accordingly.