Depression in Belgian first-year university students:

A longitudinal study of self-definition, interpersonal relatedness, mentalizing, and integration

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Interpersonal Relatedness, Mentalizing, and Integration

Abstract: Despite evidence of increasing prevalence of depression in university students, few studies investigated how depression evolves over the first months at university. We investigate severity of depression among first-year university students during their first semester at university, and whether it was associated with impairments in personality, mentalizing (or reflective functioning) and social and academic integration. Participants in this two-wave prospective study were 377 Belgian first-year students in 2018 and 2019. Results showed that maladaptive interpersonal relatedness and self-definition at the start of the first semester (T1) were prospectively associated with increases in the prevalence and severity of depression at the end of the semester (T2). Uncertainty, but not certainty, with regard to mentalizing was positively associated with severity of depression at T2 and mediated the association between personality dimensions and severity of depression. The implications of these findings for depression prevention and intervention strategies in first-year university students are discussed.

Introduction

The well-being of first-year university students is often strained owing to the new academic, social, and cultural environment at university to which they must adapt (Dyson & Renk, 2006; Fisher & Hood, 1987). However, studies suggest that not all students are equally susceptible to this distress. While some studies have reported considerable variation in the prevalence of overall depression among students, there is increasing evidence of a steady increase in depression in university students over the past decades (Ceyhan, Ceyhan, & Kurtyılmaz, 2009). The issue of depression in university students has not received much attention in the literature (Auerbach et al., 2018; Ibrahim et al., 2013), despite the potential high societal cost of depression in students as they represent "the future of any community, its hope and potential leaders" (Ibrahim et al., 2013, p. 391). Depression contributes to an accumulation of negative consequences throughout adult life through its impact on academic outcomes, career perspectives, and social relationships (Auerbach et al., 2018).

Although university students are likely to be in a socioeconomically advantageous position, which is generally considered to be a protective factor against depression, there are many factors that might increase students' vulnerability to depression, particularly in the earlier years at university (Roh et al., 2010). A sizeable body of research suggests that personality characteristics such as interpersonal relatedness, self-definition, and reflective functioning (RF) are related to susceptibility to depression during the transition from adolescence to early adulthood (Badoud et al., 2015; Blatt, 1974; Desmet et al., 2007; Luyten & Blatt, 2013; Shahar, et al., 2003). However, most studies in this area have retrospectively assessed depression. Thus, there is a need for prospective research (Brunsting, Zachry, & Takeuchi, 2018; Ibrahim et al., 2013), particularly as several studies have found significant recall bias by respondents in retrospective designs (Patten, 2009).

Research on the role of personality has focused either on the role of broad-bandwidth personality features such as the Big Five dimensions (Komarraju et al., 2009; Shi et al., 2015), or on more narrow-width personality dimensions (including interpersonal relatedness and self-definition) that are, to a greater extent than temperamental dimensions, shaped by environmental and interpersonal experiences in particular (Luyten & Blatt, 2013; Shahar et al., 2003). Particularly in the area of depression, these narrow-width personality dimensions have been shown to prospectively predict depression beyond broad-bandwidth personality dimensions (Vaillancourt & Haltigan, 2018). Moreover, with regard to intervention, there is a considerable body of research that has demonstrated that these personality dimensions may influence treatment response (Lloyd et al., 2015; Löw, Schauenburg, & Dinger, 2020). Moreover, changes in these personality dimensions as a result of psychotherapeutic treatment have been shown to be associated with decreased vulnerability for depression (Lloyd et al., 2015; Luyten & Blatt, 2013). In this context, an important body of research is emerging suggesting that the capacity for RF may be an important mediating factor in the relationship between these personality dimensions and depression (Luyten & Fonagy, 2018). RF refers to the capacity to understand oneself and others in terms of mental states, and impairments in this capacity may be particularly important in the context of explaining vulnerability to depression in the transition to university. Several studies have shown that this transition is associated with considerable challenges in the domains of both autonomy and achievement (relevant for self-definition) and relatedness (Luyten & Fonagy, 2018; Shahar et al., 2006). These challenges may be particularly difficult to negotiate for those with impairments in the capacity for RF as they may be less able to make sense of the changes they are going through, leadings to increased feelings of distress and depression. In what follows, we review extant research in this area and explain the rationale for the current study.

Personality and the Transition to University

Blatt and colleagues (1974; 1996; 2008; 2013) identified two personality dimensions that are related to increased vulnerability to depression: self-definition and interpersonal relatedness. These personality dimensions have been defined by Shahar et al. (2003) as follows: "self-definition refers to the need to establish a coherent, differentiated, stable, realistic, and positive sense of self. Interpersonal relatedness refers to the need to the stablish close, stable, nurturing, and protective relationships" (p. 470). The development of autonomy and interpersonal relatedness are inextricably linked, as the unfolding of autonomy enhances the development of relatedness. Blatt (1974) argued that unsuccessful negotiation and integration of these two developmental tasks likely contributes to feelings of depression, and this hypothesis is supported by decades of research on adults and adolescents (Blatt, 1974; Desmet et al., 2007; Luyten & Blatt, 2013; Shahar et al., 2003; Zuroff, Quinlan, & Blatt, 1990). Individuals who develop optimally become involved in relationships without losing their sense of self and can strive for achievement and self-definition without neglecting interpersonal relationships. Impairments in the capacity for interpersonal relatedness may result in high levels of dependency, which involves an intense investment in others because of strong fears of abandonment and rejection, while impairments in self-definition may lead to the development of high levels of self-criticism, which entails strong needs for achievement to avoid feelings of inferiority and a loss of self-esteem (Blatt, 1974; Luyten, 2017; Shahar et al., 2003).

Several studies have investigated the role of these personality dimensions in the transition from secondary to tertiary education. This transition has traditionally been conceptualized as involving considerable stress (Dyson & Renk, 2006). Not only do first-year students have to integrate into new social networks, they are also expected to modify their existing relationships with family and friends and adopt new study patterns (Chickering & Reisser, 1993; Fisher & Hood, 1987). As a result, the transition to adulthood is associated with

increased levels of depression, particularly in those with high levels of self-criticism (Kendler & Gardner, 2014; Luyten et al., 2006). In addition, vulnerability to depression in this phase may be further increased because the stress system undergoes major structural and functional changes at this age (Luyten & Fonagy, 2018). An important explanation for the increase in stress during adolescence is related to the increased importance of relationships with peers at this stage, while issues of agency, autonomy, and achievement are also vital (Auerbach, Admon, & Pizzagalli, 2014). First-year university students in particular are exposed to high levels of stress, as they not only have to engage in new relationships with peers in an environment where they initially do not have a large social network at first, but also have to deal with increased autonomy associated with their independent living situations and less rigid class and learning environments, and increased academic expectations compared with secondary education (Chickering & Reisser, 1993). This stress is expected to increase throughout the first year of university, as the adverse effect of factors such as homesickness, potential difficulties in establishing new social ties, and academic expectations becomes apparent only after some time (Wei, Russell, & Zakalik, 2005). In line with this expectation, several studies have found that feelings of depression at the middle or the end of the first year at university are significantly more common than at the beginning (Alfeld-Liro & Sigelman, 1998; De Coninck, Matthijs, & Luyten, 2019; Stewart-Brown et al., 2000).

Personality-Related Vulnerability to Depression

As noted, studies have generally found that both dependency and self-criticism are strongly related to feelings of depression among adolescents and young adults (Besser et al., 2020; Campos et al., 2018). Furthermore, the relationship between depressive symptoms and stress has been shown to be reciprocal in adolescents, with depressive symptoms not only appearing as a result of but also predicting stress (Blatt & Luyten, 2009; Leadbeater & Linares, 1992).

Gender differences in the prevalence of depression also emerge during adolescence. Leadbeater et al. (1999), for instance, have shown that interpersonal issues play a greater role in explaining vulnerability to depression in girls. In boys, by contrast, self-definitional issues seem to be more prominent, which puts them at increased risk both for internalizing disorders such as depression, and for externalizing problems, given their stronger needs for self-assertion and autonomy.

Recent studies suggest that the capacity for RF, also termed mentalizing, may be an important factor in explaining the relationship between personality and depression in the transition to adulthood. Two major types of impairments in RF have been identified (Fonagy et al., 2016; Badoud et al., 2015): hypomentalizing (characterized by extreme uncertainty about one's mental states, and concrete or psychic equivalent thinking, reflecting an inability to consider complex models of one's own mind and/or the mind of others) and hypermentalizing (reflecting excessive mentalizing or pseudomentalizing, that is, mentalistic representations of actions without appropriate evidence to support these models). These impairments have also been found to be related to the development of depression (Badoud et al., 2015; Luyten et al., 2012). As described by Fischer-Kern et al. (2013, p. 202), "the basic assumption of a mentalization-based approach to depression is that depressive symptoms reflect responses to threats to attachment relations and, thus, threats to the self caused by (impending) separation, rejection, or loss; by (impending) failure experiences; or a combination of these. This results in impaired and/or distorted mentalization with regard to both one's own and other people's motivations and desires". However, no studies so far have investigated the hypothesis that impairments in mentalizing may mediate the association between the personality dimensions of self-criticism, dependency, and depression among young adults in the transition to university.

Academic and Social Integration

It is important to realize that besides psychological factors, there are also several environmental characteristics that may play a role in the development of depression in university students. How students adapt to the new environment of university is associated with their chances of success in tertiary education: both drop-out rates and the academic success of first-year students are significantly affected by students' well-being (Tinto, 1975; 1987; 2006). The degree to which students successfully integrate into the academic and social fabric of their institution has a great influence on their commitment to completing the course.

Both academic and social integration have been shown to play an important role in this regard. Academic integration includes academic marks, academic self-esteem, and students' subjective evaluation of the courses they are enrolled in. Social integration covers the students' number of friends, enjoyment of university life in general, and personal contact with academic staff (Tinto, 1975; 1987; 2006). Studies have shown that students who feel at home, are well-connected to fellow students and staff, and participate in extracurricular activities, are more likely to graduate than those who do not (Rientes et al., 2012; Severiens & Wolff, 2008; Wilcox, Winn, & Fyvie-Gauld, 2005). Using the Adjective Rating Scale (ARS; Kelly & Greco, 1975), Aljohani (2016) linked students' rates of attrition to their academic and social integration and found that both types of integration were strongly linked to drop-out. Furthermore, sizeable reductions in drop-out may be achievable only by adjusting both the academic and social dimensions of the institutional environment (Thomas, 2000). Bowman (2010) also found that increased social integration, by means of forming meaningful interactions with fellow students, decreases feelings of depression among first-year students. Subsequent studies have related several aspects of academic and social integration among students to depression (De Coninck et al., 2019; Hirai, Frazier, & Syed, 2015).

Previous studies have also indicated that personality characteristics affect the degree to which students integrate into their new academic and social environment at university. Research into this relationship has almost exclusively been carried out using the Big Five personality characteristics (Hirai et al., 2015; Mesidor & Sly, 2016), and no studies so far have investigated how more narrow-bandwidth personality features such as dependency and self-criticism are related to academic or social integration into the university environment.

The Present Study

Most studies that have investigated depression or well-being in university students focus on one of two types of predictors, psychological or sociological, although Bowman's (2010) study is an exception. Bowman (2010) found that both types of predictors were relevant for student well-being, indicating that the multifaceted causation of depression requires a multidisciplinary approach. In this study, we therefore focused on potential links between dependency, self-criticism, and RF (psychological indicators), and academic and social integration (social indicators), and changes in the severity of depression over the first 3 months at university in a sample of first-year psychology students at a large university in Flanders, the northern Dutch-speaking region of Belgium. Belgium is a typical Western European country in which, similar to other Western European countries and the United States, there has been an increase in the prevalence of depression in university students. Yet, interestingly, several large-scale studies have shown that levels of depression are significantly lower in Belgian university students compared with those in most other countries (Auerbach et al., 2018; Bruffaerts et al., 2018; Steptoe et al., 2008). One explanation for this finding may be that the vast majority of university students in Belgium (approximately 69% in the current sample) typically return home during the weekend, as the small size of Belgium makes weekly commuting easy. Hence, perhaps even students who struggle with academic and social integration during their first year can

often rely on a supportive network of family and friends at home, leading to greater resilience in the face of stress associated with the transition to university.

First, in line with the literature reviewed above and the current limitations of existing research in this area, we expected that students would report significantly higher levels of depression at the end of the first semester than at the beginning (*Hypothesis 1*) (Stewart-Brown et al., 2000).

Second, given the extant literature indicating gender differences in levels of depression, we also expected to find gender differences in levels of depression, with women experiencing higher levels of depression than men (*Hypothesis 2*) (Luyten & Fonagy, 2018).

Third, in line with the literature reviewed above, we expected to find positive associations between both dependency and self-criticism and higher levels of depression during the first semester at university (*Hypothesis 3*) (Luyten et al., 2006).

Fourth, we expected that impairments in RF would mediate the association between personality dimensions assessed at the start of the semester and higher levels of depression at the end of the first semester (*Hypothesis 4*) (Badoud et al., 2015).

Finally, we expected students with high levels of academic and social integration to experience lower levels of depression than students with low academic and social integration (*Hypothesis 5*) (De Coninck et al., 2019).
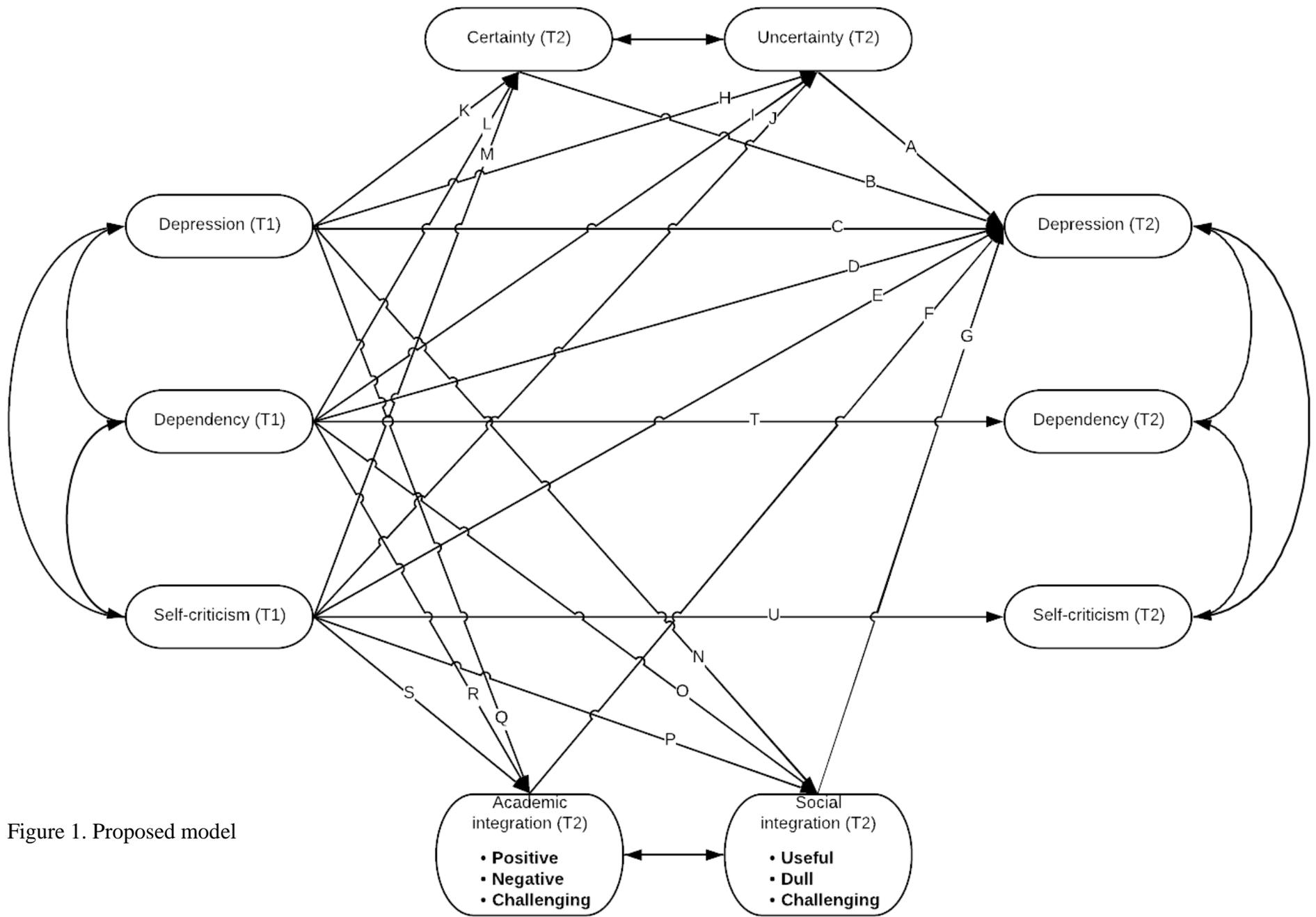
Figure 1. Proposed model

Methods

Participants and Procedures

Participants were first-year university students enrolled in a sociology course at the Faculty of Psychology and Educational Sciences at a large university in Belgium in 2018–2019 and 2019–2020. In each academic year, the first assessment took place at the start of the semester, during the first class (Time 1 (T1), at the end of September). The questionnaire was programmed in Qualtrics, an online platform for developing questionnaires and collecting data. A URL link to the questionnaire was made available on the student portal a few minutes before the class. Students were asked to participate in class via smartphone, tablet, or laptop. If this was not possible, they had the opportunity to complete the questionnaire at home the same day. Participants were unable to skip questions if they did not complete them, which meant that there were no missing data. A total of 932 students completed the assessment at T1: 469 in 2018–2019 (response rate 85%) and 463 in 2019–2020 (response rate 84%).

In the final lecture of the semester, about 3 months later (Time 2 (T2), in mid-December), the students were asked to complete the same questionnaire using the same methodology. Overall, 526 students completed the assessment at T2: 220 in 2018–2019 (response rate 40%) and 304 in 2019–2020 (response rate 55%). In total, 377 students[1] (151 (32%) in 2018–2019 and 226 (49%) in 2019–2020) provided complete data for T1 and T2. Ethical approval for this study was obtained from Social and Societal Ethics Committee of KU Leuven (G-2017 09 934).

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[1] In order to ensure that the samples of 2018–2019 and 2019–2020 did not differ significantly on key characteristics, we conducted several unpaired-samples *t*-tests. Findings indicated that both samples were comparable in terms of age, gender, socioeconomic status, and severity of depression at T1.

Measures

Severity of Depression at T1 and T2

Severity of depression was assessed with the eight-item version of the Center for Epidemiologic Studies Depression scale (CES-D), which has been translated into Dutch and validated for the Belgian population (Radloff, 1977; Van de Velde, Levecque, & Bracke, 2009). Answer categories range from 1 (*rarely/never*) to 4 (*almost always*). The items included questions on whether respondents have been feeling depressed, have felt like everything they had to do was too much effort, have been sleeping poorly, have been lonely, have been happy, have enjoyed life, have felt sad, and have felt like they did not want to start their day over the past week (Cronbach's α_{T1} = .84; Cronbach's α_{T2} = .87). This version of the CES-D has a potential range of 0–24, with higher scores reflecting a greater number of self-reported depressive symptoms. Higher scores indicate higher levels of severity of depression.

Reflective Functioning at T2

Fonagy et al. (2016) developed the Reflective Functioning Questionnaire (RFQ), a self-report questionnaire consisting of eight items (answer categories: 1 = *strongly disagree* to 7 = *strongly agree*) to assess two types of impairments in RF, with satisfactory consistency and validity in adult and adolescent samples (Badoud et al., 2015). In this study, we used the validated Dutch version of the RFQ (Fonagy et al., 2016). The Uncertainty about mental states subscale assesses hypomentalizing (six items with high scores reflecting too much uncertainty; Cronbach's α = .74) and the Certainty about mental states subscale that assesses individuals' certainty about mental states (six items with high scores reflecting too much certainty, i.e. hypermentalizing; Cronbach's α = .76).

Personality Characteristics at T1 and T2

The brief version of the Depressive Experiences Questionnaire for Adolescents (DEQ-A) (Blatt et al., 1992), which was translated into Dutch by Luyten, Corveleyn, and Blatt (1997), was

used to assess Dependency and Self-Criticism. This shortened version of the DEQ-A contains 20 items, with answer categories ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). In this study, we included only the self-criticism (eight items, to assess maladaptive self-definition; Cronbach's only α_{T1} = .80; Cronbach's α_{T2} = .80) and dependency (eight items, to assess maladaptive interpersonal relatedness; Cronbach's α_{T1} = .73; Cronbach's α_{T2} = .76) subscales.

Academic and Social Integration at T2

To assess academic and social integration, we used the Adjective Rating Scale (ARS) developed by Kelly and Greco (1975). In the ARS, 24 adjectives are presented that indicate emotions or feelings that students may have had about the academic and social environment they had been living in for the past few months. Students were asked to rate the extent to which they felt each adjective accurately described their experience of their academic and social environment. Answer categories ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Some items were reverse coded prior to analysis. Principal component analysis with varimax rotation indicated three underlying components towards academic integration: positivity, negativity, and challenging. For social integration, we also found three components: dull, challenging, and useful. Following reliability analyses, we found that one component of academic integration (positivity) and two components of social integration (challenging and useful) were reliable (see Table A2 in the supplementary materials for Cronbach's α values and number of items per construct). The other components were not used in further analyses.

Sociodemographic Characteristics

Students were asked to indicate their age, gender (1 = male, 2 = female), type of secondary education[2] (1 = general secondary education, 2 = vocational secondary education, 3 = artistic secondary education, 4 = technical secondary education), parents' educational attainment (1 = primary school, 2 = secondary school, 3 = non-university higher education, 4 = university education), and parental cohabitation status (1 = married, 2 = unmarried cohabitation, 3 = legally divorced, 4 = separated, 5 = never cohabited).

Analytic Strategy

We focused on the 377 students who completed both assessments. We conducted paired-samples *t*-tests to investigate whether depression scores differed between T1 and T2, and a repeated-measures ANOVA to investigate gender differences in levels of depression. We then conducted a cross-lagged panel structural equation model (SEM) with weighted least squares estimation (see Figure 1) to investigate whether personality at T1 prospectively predicted severity of depression at T2, and whether these relationships were mediated by RF and academic and social integration at T2. We also included potential "scarring" effects of T1 depression on T2 personality dimensions. Muthén and Muthén (2002) investigated the required sample size to detect significant growth factors in SEM and found that it varies based on the expected effect size, missing data, and the inclusion of covariates. They found that a sample size of 250 was necessary to detect a medium effect size in a growth model (Muthén & Muthén,

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[2] The second (15–16-year-olds) and third (17–18-year-olds) degrees of the Flemish secondary school system are divided into four types: general secondary education, technical secondary education, vocational secondary education, and artistic secondary education. In 2017–2018, 42% of second- and third-degree students were enrolled in general secondary education, 31% in technical secondary education, 25% in vocational secondary education, and 2% in artistic secondary education (Vlaamse Overheid, 2018).

2002). Our sample size clearly exceeds this number ($N = 377$), and it therefore seems safe to conclude that the present study is adequately powered to test the study hypotheses. SEMs allow multiple relationships to be analyzed simultaneously, enabling the user to build more complex statistical models rather than running several linear regressions. The relative strengths of longitudinal relationships can be determined through comparison of standardized betas (Juengst et al., 2017). We estimated (1) associations between depression, self-criticism, and dependency at T1 and T2; (2) associations between depression, self-criticism, and dependency at T1 with RF and academic and social integration at T2; and (3) associations between RF and academic and social integration at T2 with depression at T2. We controlled for age, gender, socioeconomic status, type of secondary education, and parental cohabitation status, but did not include these indicators in Figure 1 because they were not significantly associated with severity of depression.

All analyses were conducted using SAS version 9.4. Model fit for the cross-lagged analysis was evaluated using state-of-the art guidelines (Hooper, Coughlan, & Mullen, 2008): the Root Mean Squared Error of Approximation (RMSEA) should be lower than or equal to 0.08 for an acceptable fit (Byrne, 1998) and close to 0.06 for a good fit (Hu & Bentler, 1999); the Comparative Fit Index (CFI) should be higher than or equal to 0.90 for an acceptable fit, and close to or higher than 0.95 for a good fit (Hu & Bentler, 1999); and the Goodness-of-Fit statistic (GFI) should also be higher than or equal to 0.90 for an acceptable fit, and close to or higher than 0.95 for a good fit (Hooper et al., 2008). The Akaike Information Criterion (AIC) indicates which model is the most parsimonious. Smaller values suggest a well-fitting, parsimonious model. However, because this indicator is not normed to a 0–1 scale it is difficult to suggest a cut-off other than that the model that produces the lowest value is the most superior. We used Maximum Likelihood estimation with standard errors that are robust to non-normality of the data (Muthén & Muthén, 2002).

Results

Descriptive Features of the Sample

The sample consisted mainly of women (86.7%), which is typical of psychology students in Flanders, Belgium. Most respondents had completed general secondary education (92%), had highly educated parents (73.1%) who were mostly married or cohabiting (74.2%), and were enrolled at university for the first time (98%). Of the total sample, over 95% was between 17 and 19 years old (mean age = 18.2 years).

Mean Level Differences in Severity of Depression

Consistent with Hypothesis 1, there was a significant increase in levels of depression among first-year students between T1 and T2 ($t = -7.64$, $p < .001$): students reported higher levels of depression at T2 ($M = 8.90$, $SD = 4.56$) than at T1 ($M = 7.48$, $SD = 4.07$), representing a small to medium effect size (Cohen's $d = 0.35$). Using a cut-off score of 9 on the CES-D (Briggs et al., 2018), T1 data showed that 27.7% ($n = 103$) of students had a possible risk for clinical depression; at T2 this had significantly increased to 38.8% ($n = 145$) of students ($t = -4.75$, $p < .001$) having a possible risk for clinical depression. Post hoc analyses showed that this increase was observed in both male ($t = -2.20$, $p = .031$) and female ($t = -3.78$, $p < .001$) students. In order to address concerns about selective study drop-out, we found that (using a cut-off score of 9) 28.3% of students who dropped out after T1 showed a possible risk of clinical depression, which did not statistically differ from the 27.7% among the students who completed the assessments at both T1 and T2. Hence, there was no evidence of selective study drop-out as a function of depression. However, Hypothesis 2 was not confirmed, as there were no significant differences in levels of depression at T1 or T2 between female ($M_{T1} = 7.57$, $M_{T2} = 9.02$) and male ($M_{T1} = 6.94$, $M_{T2} = 8.10$) students ($F = .003$, $p = .955$).

Table 1. Pearson correlations of the study variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Depression at T1	1										
2. Depression at T2	.67**	1									
3. Certainty (RFQ) at T2	−.12*	−.18**	1								
4. Uncertainty (RFQ) at T2	.35**	.42**	−.52**	1							
5. Dependency (DEQ-A) at T1	.24**	.27**	−.19**	.29**	1						
6. Self-criticism (DEQ-A) at T1	.54**	.49**	−.29**	.35**	.43**	1					
7. Dependency (DEQ-A) at T2	.11*	.25**	−.25**	.35**	.65**	.37**	1				
8. Self-criticism (DEQ-A) at T2	.52**	.58**	−.30**	.39**	.12*	.77**	.45**	1			
9. Academic integration – Positive at T2	−.06	−.13*	.09	−.08	.07	−.10	.03	−.12*	1		
10. Social integration – Unusual at T2	.11*	.11*	−.05	.12*	.21**	.02	.13*	.06	.16**	1	
11. Social integration – Challenging at T2	−.08	−.11*	−.01	−.12*	−.02	−.06	−.03	−.06	.23**	.65**	1

Note: $N = 377$. * $p < 0.05$. ** $p < 0.01$. DEQ, Depressive Experiences Questionnaire for Adolescents; RFQ, Reflective Functioning Questionnaire.

Structural Equation Modeling

As expected, significant positive correlations between severity of depression, dependency and self-criticism, and RF were observed. Moreover, uncertainty and certainty about mentalizing were negatively correlated ($r = -.52$, $p < .01$), and there was a positive correlation between dependency and self-criticism ($r_{T1} = .43$, $p < .01$; $r_{T2} = .45$, $p < .01$).

The proposed theoretical model, however, did not provide a good fit to the data (RMSEA = .14, GFI = .91, CFI = .72, AIC = 1974.42, $\chi^2 = 1111.69$, df = 326, explaining 70% of the variance of depression at T2). Deleting non-significant paths (B, F, G, K, N, O, and S in Figure 1) yielded a model with excellent fit (RMSEA = .07, GFI = .98, CFI = .96, AIC = 714.52, $\chi^2 = 405.86$, df = 145). This model explained 68% of the variance of depression at T2 (see Figure 2).

In this model, as predicted by Hypothesis 3, both T1 dependency ($\beta = .08$, $p < .014$) and T1 self-criticism ($\beta = .20$, $p < .001$) were significant predictors of severity of depression at T2. Moreover, uncertainty with regard to mentalizing at T2 was positively associated with depression at T2 ($\beta = .20$, $p < .001$). However, only uncertainty, but not certainty, with regard to mentalizing assessed at T2 mediated the association between dependency and self-criticism and severity of depression, as evidenced by the significant indirect effects of dependency and self-criticism on depression at T2 (see Table 2). Hence, our hypotheses about the mediating effect of problems with RF (Hypothesis 4) were only partially confirmed.

Results did not provide support for Hypothesis 5, that is, that students with high academic integration and social integration would report lower levels of depression than students with low academic and social integration. Academic and social integration were not related to severity of depression at T2. However, both severity of depression at T1 and dependency at T1 were related to positive academic integration at T2, but in different directions, and associations were relatively weak: severity of depression was weakly negatively

associated with academic integration ($\beta = -.04$, $p = .043$), whereas higher levels of dependency were positively associated with academic integration ($\beta = .14$, $p < .001$). Self-criticism was negatively associated with social integration ($\beta = -.15$, $p = .003$).

Finally, we also found some evidence for "scarring" effects of depression on both personality dimensions and RF, although most of these paths were not significant. One exception was the path from severity of depression at T1 to uncertainty with regard to mentalizing at T2 ($\beta = .11$, $p = .035$).

Table 2. Standardized indirect effects estimates of personality characteristics and feelings of depression at T1 on feelings of depression at T2

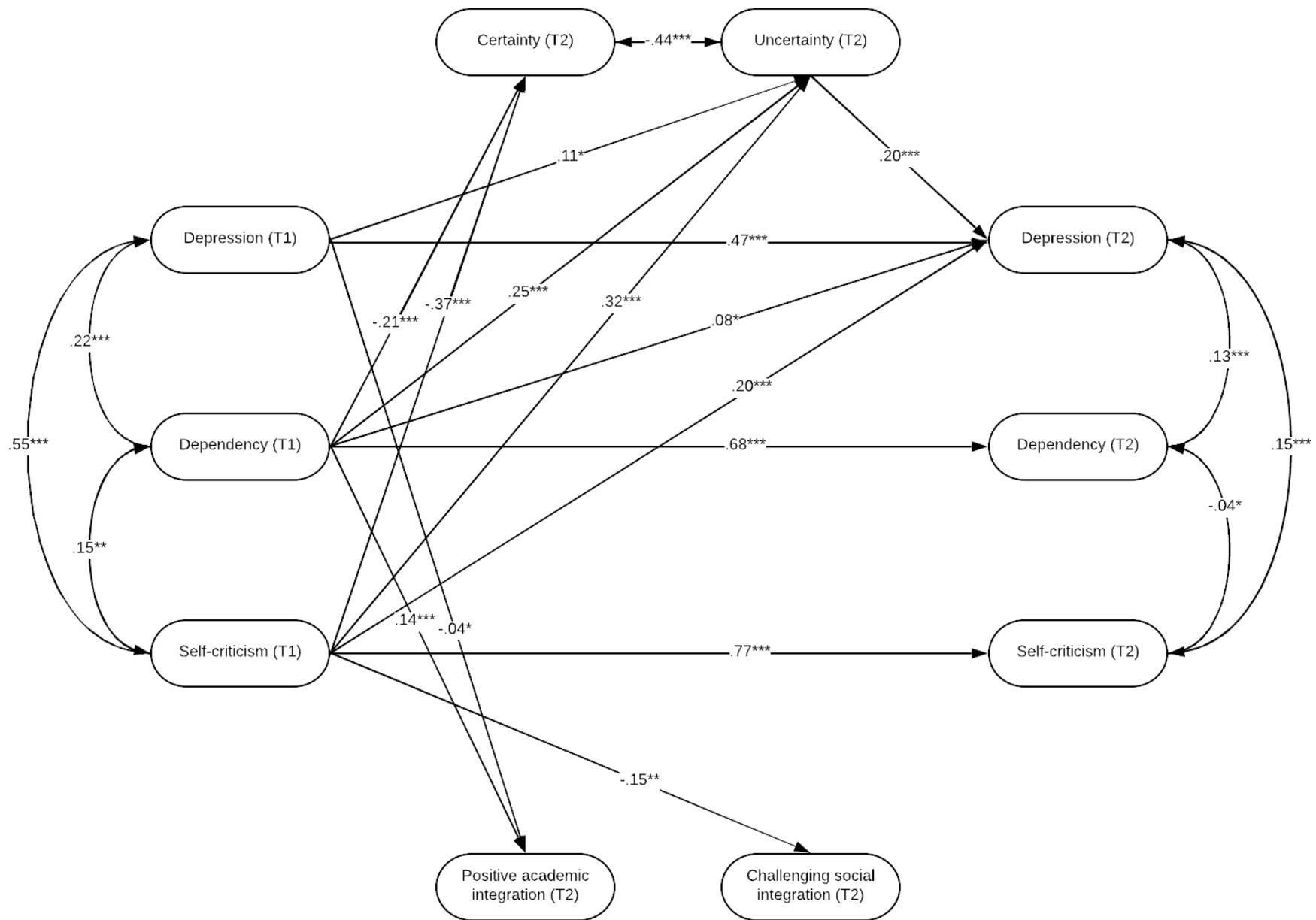|	β	SD	p-value
Dependency T1 > Depression T2	.06	.02	.000
Self-criticism T1 > Depression T2	.10	.02	.000
Depression T1 > Depression T2	.00	.00	.206

Note: T1 = Time 1; T2 = Time 2.

Figure 2. Cross-lagged panel analysis

Note: * *p* < 0.05. ** *p* < 0.01. *** *p* < 0.001. Standardized direct effects are reported. Only significant paths are presented. Not shown in the model are the control variables, none of which were significantly associated with severity of depression at either T1 or T2

Discussion

The transition to university is generally considered to be associated with increased risk for depression (Auerbach et al., 2018; Ibrahim et al., 2013). Yet, the role of both psychological and sociological processes involved remain largely unclear. The main aim of this study was therefore to investigate levels of depression among first-year university students at the start and the end of the first semester, and the role of personality, problems with RF, and academic and social integration in explaining possible changes in feelings of depression over the course of the first semester. The finding that feelings of depression increased over the first semester at university underlines the idea that the transition from secondary to tertiary education is difficult for many first-year students (Roh et al., 2010). Specifically, a 10% increase (from 27.7% to 38.8%) in students with a potential risk for clinical depression was observed between the start and end of the first semester, which is quite substantial. Moreover, the finding that about one-third (27.7%) of first-year students were at-risk for depression at the very start of their university career is consistent with a large study (total $n = 13,984$) in eight countries reporting that between 19.1% and 43.3% of first-year university students are at risk for depression (Auerbach et al., 2018). The fact that severity of depression increased in the first semester in university students contributes to a growing literature suggesting that the transition to university might be an important stressor explaining increases in depression rates in young adults (Auerbach et al., 2018; Ceyhan et al., 2009; De Coninck et al., 2019; Ibrahim et al., 2013). Yet, further research is needed, as not all studies in this area have yielded similar findings (Ibrahim et al., 2013). Possible explanations for the variation in findings may be the method of assessment, geographical location, demographic factors, or social characteristics (i.e., socioeconomic status) (Ibrahim et al., 2013; Kaplan, Shema, & Leite, 2008; Steptoe et al., 2007). Many studies in this field use convenience samples of university students, often medical

students in the United States (Ibrahim et al., 2013; Roh et al., 2010), who are usually not representative of the student population of a university, let alone a region or country.

The absence of gender differences in severity of depression ran contrary to our expectations that young women would exhibit greater vulnerability to interpersonal concerns and reactivity to stressful life events than young men would (Leadbeater et al., 1999). Several studies found gender differences in depression in college and university samples (Brunsting et al., 2018; Ibrahim et al., 2013). Interestingly, studies in this area suggest that while women typically have lower levels of self-criticism than men, little or no gender differences are observed in student samples in terms of self-criticism, putting women at the same increased risk for depression as men. This was also the case in the present study.

The fact that problems with interpersonal relatedness and maladaptive self-definition were significantly associated with higher levels of depression further extends findings suggesting that young adults with problems in these areas are at increased risk in the transition to adulthood (Shahar et al., 2003). As in most other studies, the personality dimension of self-criticism was more strongly associated with depression than maladaptive relatedness was. Given that self-criticism reflects problems with establishing a coherent and stable sense of self, it is not surprising that this factor was more strongly associated with depression in the first semester, a time of great uncertainty and instability for university students (Chickering & Reisser, 1993). This may be particularly the case in Belgian university students, as they typically either commute to and from university every day or return home to their parent(s) most weekends. Because of this, problems with interpersonal relatedness may play a smaller role than self-criticism in the transition to university in Belgium compared with other countries such as the United States, where students often spend the whole first semester at university without returning home. Hence, on average, first-year university students in Belgium may have greater access to close, nurturing, and protective relationships regardless of their level of

academic and social integration at university. If this is true, it once again emphasizes the need to consider the geographical location of a study when interpreting differences in feelings of depression and its associated factors (Ibrahim et al., 2013).

Regarding RF, results show that uncertainty about mental states was positively associated with depression among first-year students, while no relationship was found between depression and certainty about mental states. These results are consistent with earlier findings by Fonagy et al. (2016), who reported that uncertainty about mental states (i.e. hypomentalizing) was related to vulnerability to a wide range of mental health disorders, including depression. Hence, serious problems with RF, as expressed in high levels of hypomentalizing, seem to be particularly relevant in understanding the role of personality-related vulnerability to depression in the transition to university. It can be hypothesized that students with high levels of hypomentalizing (i.e., severe impairments in the capacity to reflect on themselves and others) may be unable to make sense of the many changes that are associated with the transition to university. In combination with personality-related vulnerability to depression, this may pave the way for increasing feelings of distress and depression. Students with high levels of dependency, for instance, may increasingly feel alone and unable to deal with the many pressures to achieve and to live on their own. As a result, their capacity to reflect on what is happening to them is increasingly impaired, resulting in serious problems in making sense of what is happening to them, and they may begin to increasingly feel depressed. The fact that these young adults may have a greater capacity to turn to others for help (both within their family and with peers, as is also shown by the positive relationship between dependency and academic integration) may somewhat mitigate the negative impact of impairments in mentalizing, as others may help them to navigate through these challenging times (Luyten, Campbell, & Fonagy, 2020a). Those with high levels of impairments in mentalizing and high levels of self-criticism, in turn, may increasingly begin to feel that they will fail to meet

academic standards, leading to increased levels of depression. Moreover, because they have the underlying belief that they have to be able to deal with challenges on their own, young adults with high levels of self-criticism have been shown to be unwilling to seek help from others for their problems. This typically leads to social isolation (as is also evidenced in the negative relationship between self-criticism and social integration), further increasing the risk for depression (Luyten & Fonagy, 2019).

Problems with certainty about mental states were not associated with severity of depression in the current study, replicating findings reported by Fonagy et al. (2016), who explain this by suggesting that the certainty about mentalizing subscale primarily taps into more adaptive features of mentalizing, and thus only very high scores on this scale reflect hypermentalizing. Further research in this context is needed, but it is clear that impairments in the capacity to reflect on one's own and others' mental states may lead to greater difficulties in managing the transition to university life and its many challenges.

Academic and social integration were not associated with severity of depression in this study. This was contrary to our expectations, given Bowman's (2010) finding that social integration by means of forming meaningful interactions with fellow students decreases feelings of depression among first-year students, and De Coninck et al.'s (2019) finding regarding the role of academic integration in the role of student well-being.

Strengths and Limitations

This study has several strengths. First, it is one of the first studies to prospectively assess levels of depression in first-year university students from the start to the end of the first semester (Brunsting et al. 2018; Ibrahim et al. 2013). Most studies in this area have assessed depression either cross-sectionally or retrospectively. Second, with one exception (Bowman 2010), this study is the only one to simultaneously investigate both psychological (i.e., personality and RF) and sociological (i.e., academic and social integration) factors in explaining depression in

university students. Finally, to our knowledge this is the first study to investigate whether impairments in RF mediate the association between self-criticism, dependency, and depression in university students.

Yet, several limitations should be noted. First, most participants were young, female first-year university students, whose parents had both completed higher education[3], and who were enrolled in a psychology program. Therefore, we must be careful in generalizing these findings to other populations, such as older students, socioeconomically deprived students, or students from other faculties. Furthermore, it is unclear whether the observed increases in depression persist. Moreover, this study collected data from only two time points (the beginning and end of the first semester) for first-year students. It is unclear how the relationships among these variables may change over longer periods of time (e.g., the beginning and end of the first, second, or subsequent years at university). The addition of more data points over a longer period would enhance our understanding of these relationships beyond the first year of university life. Also, the mediator (RF) and depression were measured at the same time point. It may be argued that hypomentalizing is a feature of depression, and thus the purported mediator and outcome (severity of depression) overlap. This is definitely a possibility, as RF has been shown to contain both state and trait features, and impairments in RF have been shown to be positively correlated with the duration of depression. Yet, studies have also shown that impairments in RF prospectively predict increases in depression, and elevated levels of impairments in RF have been consistently found in remitted depressed patients, suggesting only modest overlap (Fischer-Kern et al., 2013; Luyten et al., 2019). The current study was also limited to self-report data, which raises the potential problem of mono-method bias. Self-report data are based on participants' own subjective experience, which may differ from other methods of assessment such as observational data, reports from other

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[3] The share of male participants with highly educated parents was similar to that of female participants.

individuals (e.g. close friends or family members), and clinical interviewers. Finally, only approximately 40% of participants completed assessments at both T1 and T2. This is not entirely surprising, as many students in Belgium drop out of university during the first semester because university education is almost completely free, and thus there are few financial repercussions of dropping out of university. Although we did not observe any significant differences in initial levels of depression and sociodemographic characteristics in attrition analyses, it is possible that other factors may have influenced whether students dropped out of the study. Finally, the observed increase in feelings of depression at the end of the semester could also be (partially) attributed to factors not under investigation in this study. Given the already elevated levels of depression among almost 30% of participants at the start of the semester, it is possible that other stressors that precede the transition from secondary to tertiary education, such as a precarious socioeconomic position, parental and/or peer pressures in academic or social contexts, and parental difficulties may—perhaps in interaction with the transition to university—exacerbate feelings of depression. It therefore remains important to consider other social, psychological, and familial factors in investigations of depression among university students.

Clinical Implications

These findings, if further replicated, have important implications for prevention and intervention with university students. A wide array of both psychological and pharmacological treatments has been shown to be effective in the treatment of depression (Cuijpers et al., 2019). More importantly, several treatments have been empirically evaluated that specifically target personality dimensions such as self-criticism and dependency (Lloyd et al., 2015; Löw et al., 2020) as well as impairments in mentalizing (Luyten et al., 2020b), and thus there is a clear need to implement these treatments, including a number of online treatments, in university counselling centers. At the same time, more efforts are needed to address barriers to treatment

seeking in university students, particularly for students scoring high on self-criticism. Studies suggest that considerable barriers to treatment seeking exist in university students, with as few as 25.3–36.3% of students with mental health problems effectively considering seeking help (Bruffaerts et al., 2018). Internet-based interventions may considerably lower the threshold for help seeking among university students, but more research is needed to determine their effectiveness in this population (Auerbach et al., 2018; Bruffaerts et al., 2018). In particular, research is needed to determine the effectiveness of these interventions in self-critical students, as self-critical individuals have been shown to avoid seeking help, and, even when they do seek help, they are often less responsive to treatment because of their self-critical attitude and their tendency to avoid interpersonal relationships (Löw et al., 2020). Perhaps online self-help might be more effective for these individuals, as it does not involve a relationship with a mental health professional. By contrast, highly dependent students may be more responsive to face-to-face interventions, given their tendency to seek out and value interpersonal relationships. Hence, more studies are needed to investigate whether internet-based interventions do indeed reach the most "hard-to-reach" university students (i.e., those students who close themselves off from social contacts, including contacts with mental health services). In this context, innovative interventions (e.g., a buddy system where at-risk students are mentored by other students) may be more effective. In the meantime, the relatively high proportion of university students that are at risk for depression at the start of their studies, and the increase in levels of depression in the first semester, emphasize the need for prevention and intervention in this population.

Conclusions

This prospective study of 377 students at the beginning and end of the first semester at a large European university provides new insight into the relations between severity of depression, narrow-bandwidth personality dimensions such as dependency and self-criticism, RF, and academic and social integration. We found that severity of depression increased across the first

semester at university, with no clear gender differences. By the end of the first semester, almost 40% of students were at risk for depression. Moreover, impairments in RF mediated the association between dependency, self-criticism and severity of depression. Social and academic integration were not associated with depression.

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Supplementary materials

Table A1. Paired-samples t-tests of certainty and uncertainty

	t-test statistic	*p*-value	*SD*	Mean
Mentalizing				
Certainty	1.91	.06	–	–
Uncertainty	-2.29	.02	–	–
Certainty				
Time 1	–	–	.65	0.83
Time 2	–	–	.66	0.78
Uncertainty				
Time 1	–	–	.55	0.76
Time 2	–	–	.62	0.82

Table A2. Reliability analyses of academic and social integration components

		Cronbach's alpha
Academic integration	Positive (13 items)	**.85**
	Negative (9 items)	.57
	Challenging (6 items)	.27
Social integration	Dull (6 items)	.04
	Useful (11 items)	**.77**
	Challenging (5 items)	**.73**