

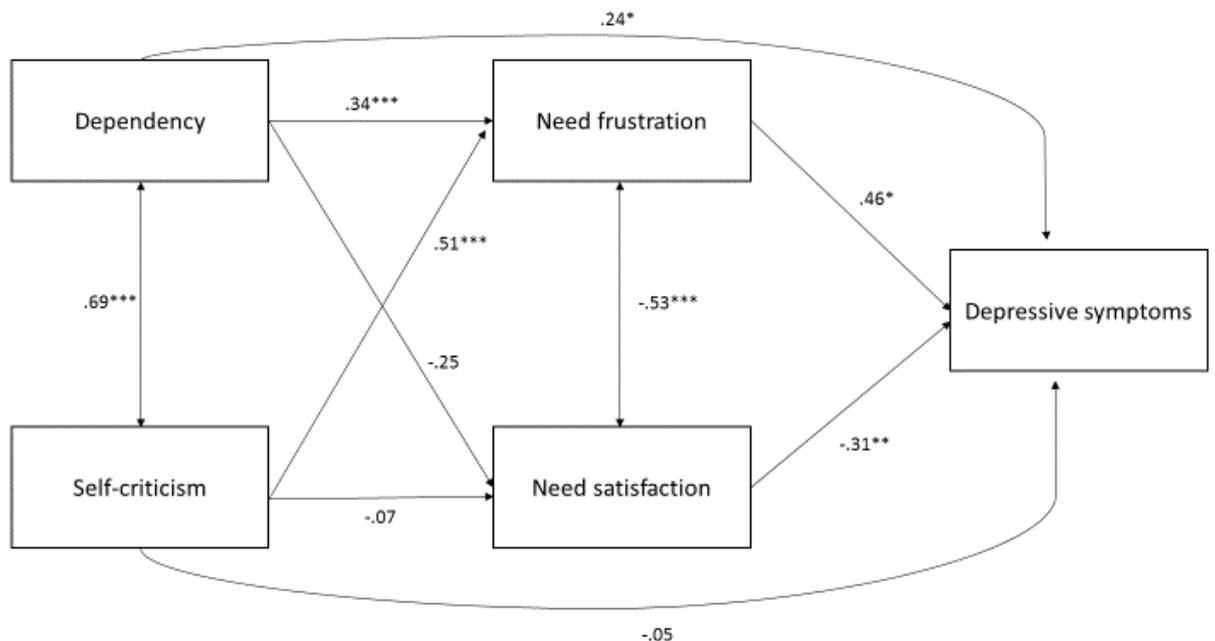
Supplemental materials

1. Mediation analysis at the between-person level of analysis

In the main analyses, we focused on the associations at the within-person level. In these supplementary materials we added the results at the between-person level. As can be seen in the figure below, most of the associations obtained at the within-person level were replicated at the between-person level. Most importantly, both dependency and self-criticism related positively to need frustration also at the between-person level, with need frustration in turn relating positively to depressive symptoms.

Figure 1 – Supplemental Materials

Standardized coefficients for the role of need-based experiences in the relation between dependency, self-criticism and depressive symptoms at the between-person level



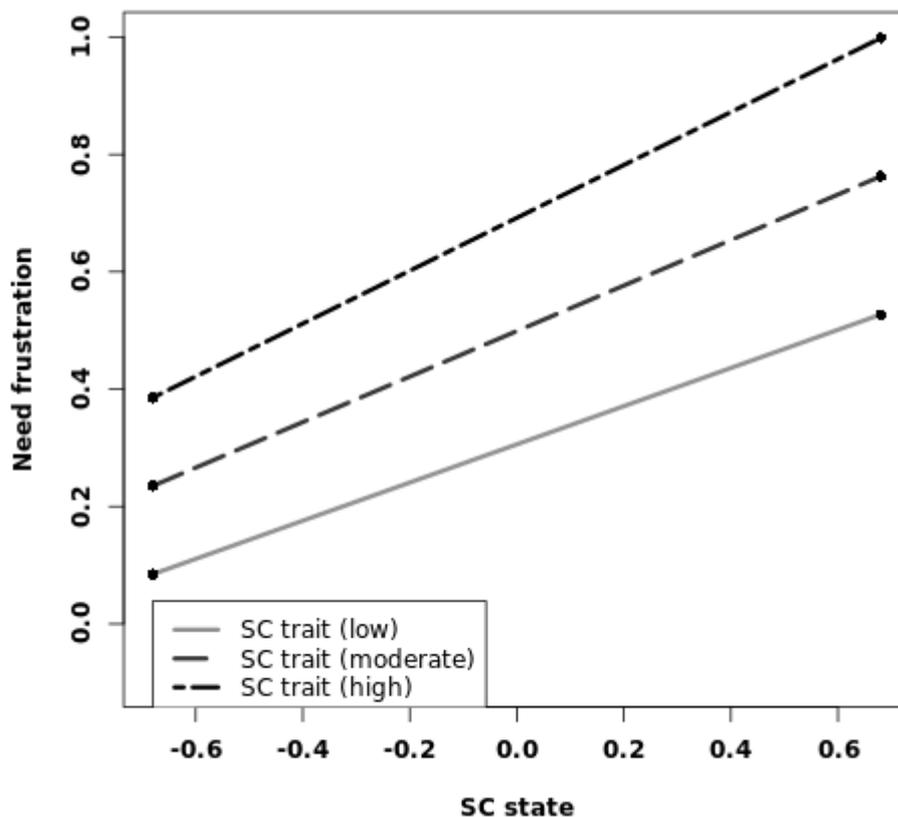
* $p < .05$. ** $p < .01$. *** $p < .001$.

2. Cross-level interactions between state- and trait-levels of self-criticism and dependency

We conducted additional multilevel models in which we examined interactions between trait (i.e., between-person) and state (i.e., within-person) levels of dependency and self-criticism. These interactions were tested in the prediction of need frustration, need satisfaction, and depressive symptoms. Only one such interaction turned out to be significant. Individuals scoring high on the between-person level of self-criticism displayed a stronger within-person association between within-person self-criticism and need frustration. Interaction effects regarding trait and state dependency were not significant.

Figure 2 – Supplemental Materials

Cross-level interaction between state- and trait-levels of self-criticism



3. Overview of the indirect effects using three different approaches

To test the robustness of the indirect effects, we examined the mediation model using three different approaches, namely the model indirect in Mplus, Bayesian analyses in Mplus (Muthén & Muthén, 1998-2010) and the prodclin program in R (MacKinnon, Fritz, Williams, & Lockwood, 2007). All three approaches yielded highly comparable results. The exact results can be found in the table below.

Table 1 – Supplemental Materials

Overview of the indirect effects from dependency and self-criticism to depressive symptoms through need satisfaction and need frustration using three different approaches

Indirect effect	Mplus model indirect		Bayesian analyses		prodclin program	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
SC → NF → DS	0.097	$p < .001$	0.096	$p < .001$	0.097	$p < .001$
SC → NS → DS	0.036	$p < .001$	0.037	$p < .001$	0.036	$p < .001$
Dep → NF → DS	0.056	$p < .001$	0.055	$p < .001$	0.056	$p < .001$
Dep → NS → DS	0.025	$p < .01$	0.026	$p < .001$	0.025	$p < .001$

Note. Dep = dependency; SC = self-criticism; NF = need frustration; NS = need satisfaction; DS = depressive symptoms.

4. Correlations between the three specific needs and the study variables

We also explored the correlations between each of the three specific needs and the study variables. As presented in the table below, the three separate needs all showed a similar correlation pattern with the other study variables (personality and depressive symptoms). Indeed, satisfaction of the three specific needs for autonomy, relatedness and competence was negatively correlated with dependency, self-criticism and depressive symptoms. Frustration of the three specific needs was positively correlated with dependency, self-criticism and depressive symptoms. Notably, the most pronounced correlations were the correlation

between dependency and relatedness frustration and between self-criticism and competence frustration.

Table 2 – Supplemental Materials

Correlations between personality, the three separate needs and depression at the within-person level.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Dependency	1								
2. Self-criticism	.30**	1							
3. Autonomy satisfaction	-.16**	-.28**	1						
4. Relatedness satisfaction	-.28**	-.26**	.17**	1					
5. Competence satisfaction	-.25**	-.40**	.35**	.32**	1				
6. Autonomy frustration	.22**	.34**	-.40**	-.25**	-.25**	1			
7. Relatedness frustration	.43**	.23**	-.12**	-.47**	-.22**	.25**	1		
8. Competence frustration	.25**	.61**	.32**	-.25**	-.44**	.34**	.28**	1	
9. Depressive symptoms	.38**	.41**	-.35**	-.38**	-.38**	.33**	.46**	.40**	1

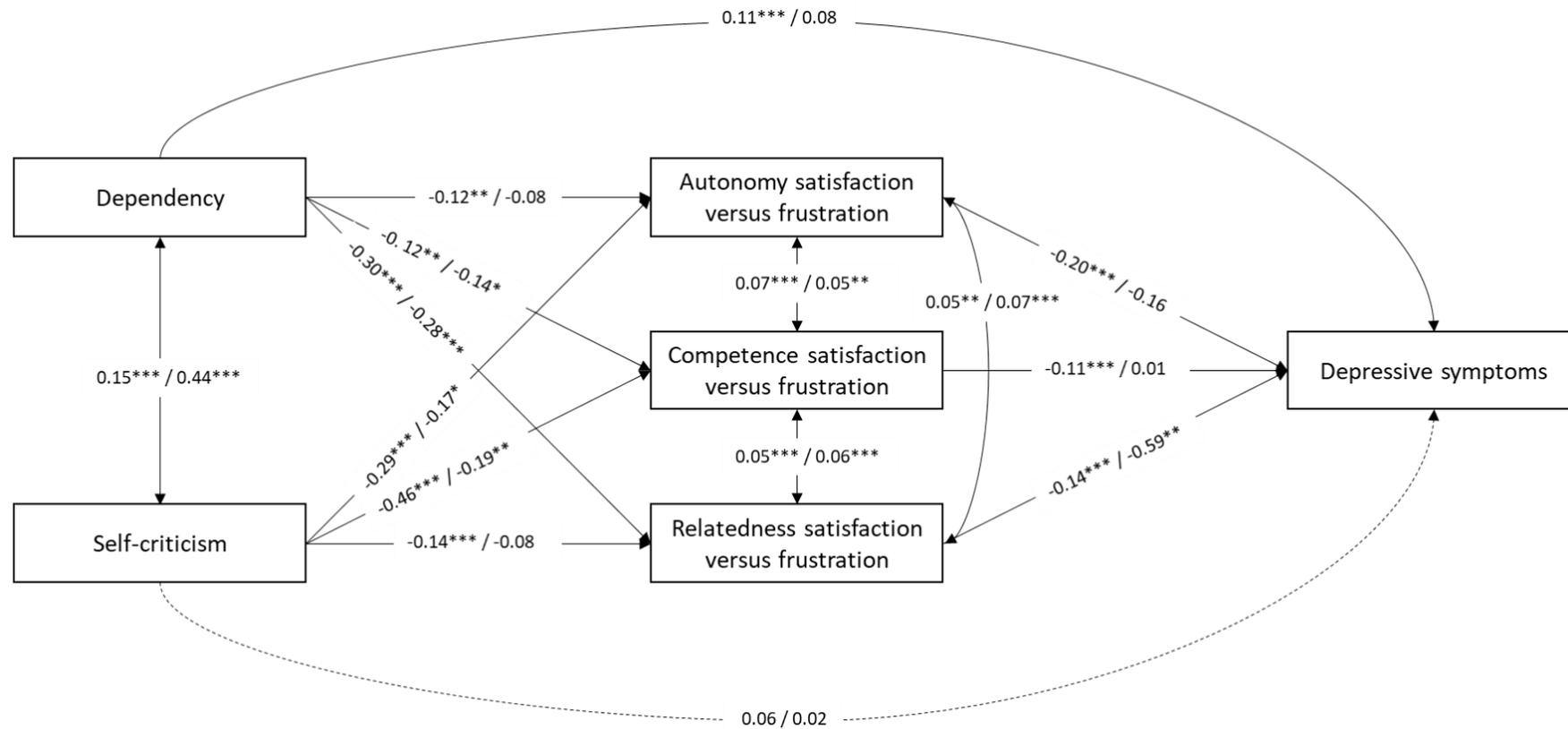
* $p < .05$. ** $p < .01$.

5. Mediation model with the three specific needs

The main mediation analyses were conducted using composite scores for need satisfaction and need frustration. In an additional analysis, we also estimated the mediation model using scores for each of three separate needs. Given that satisfaction or frustration of the separate needs were measured with only 2 items, the three specific needs were studied by computing a composite score of need satisfaction and need frustration for each of the three needs. To this aim, the need frustration items were reverse scored, and were then averaged with the need satisfaction items resulting in an aggregated score for satisfaction versus frustration of each need. As can be seen in the figure and table below, self-criticism is especially linked to lower autonomy and competence satisfaction (and higher frustration of these needs), whereas dependency is especially related to a lower relatedness satisfaction (and higher relatedness frustration). Importantly, also when using scores for the three separate needs, all indirect effects between the personality dimensions and depressive symptoms were significant at the within-person level.

Figure 3 – Supplemental Materials

The role of need-based experiences in the relation between dependency, self-criticism and depressive symptoms both at the within- and between-person level of change.



Note.

First standardized coefficient represents the within-person level, second standardized coefficient represents the between-person level. * $p < .05$. ** $p < .01$. *** $p < .01$.

Table 3 – Supplemental Materials

Indirect effects from dependency and self-criticism to depressive symptoms through autonomy, competence, and relatedness satisfaction versus frustration

	Depressive symptoms	
	Within-person level B (s.e.)	Between-person level B (s.e.)
Dependency		
Autonomy satisfaction (versus frustration)	0.03 (0.01)**	0.01 (0.02)
Competence satisfaction (versus frustration)	0.01 (0.01)*	-0.001 (0.02)
Relatedness satisfaction (versus frustration)	0.04 (0.01)**	0.017 (0.07)*
Self-criticism		
Autonomy satisfaction (versus frustration)	0.06 (0.01)***	0.03 (0.02)
Competence satisfaction (versus frustration)	0.05 (0.02)***	-0.001 (0.03)
Relatedness satisfaction (versus frustration)	0.02 (0.01)**	0.05 (0.04)

Moreover, moderation analyses with the three separate scores for the needs showed that the negative association between autonomy satisfaction (versus frustration) and depressive symptoms is more pronounced at high levels of dependency, an effect that occurred both at the within- and between-person level. Similarly, the negative association between competence satisfaction (versus frustration) and depressive symptoms was more pronounced at high levels of dependency, an effect that occurred only at the between-person level (see the three figures below). However, we should be cautious to interpret the results given that the reliabilities of the separate need scales were lower.

Figure 4 – Supplemental Materials

Interaction between autonomy satisfaction versus frustration and dependency at the within-person level

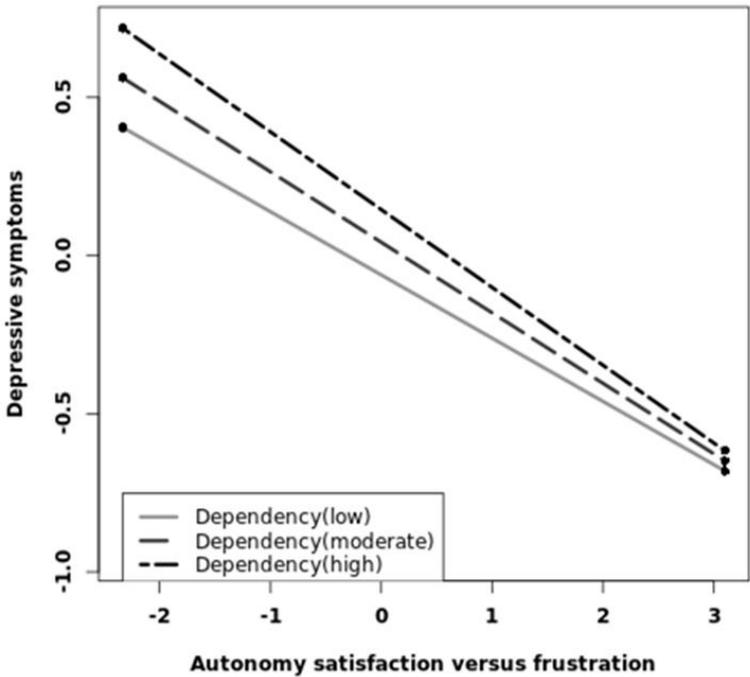


Figure 5 – Supplemental Materials

Interaction between autonomy satisfaction versus frustration and dependency at the between-person level

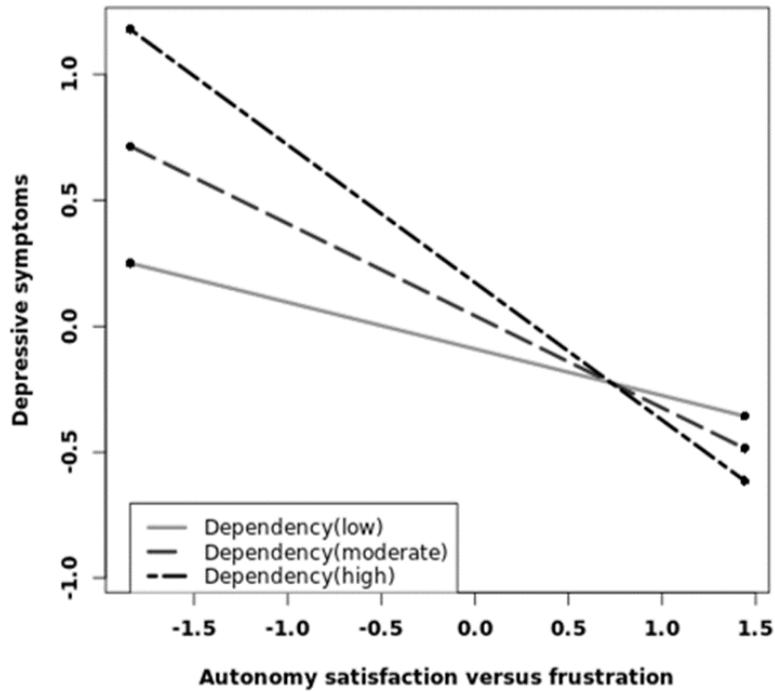
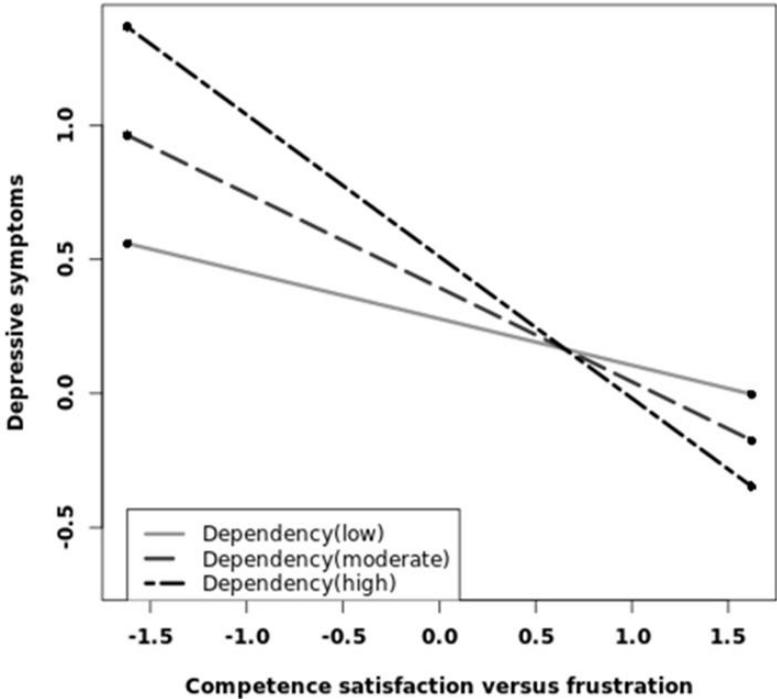


Figure 6 – Supplemental Materials

Interaction between competence satisfaction versus frustration and dependency at the between-person level



6. Interactions between dependency and self-criticism at the within-person and the between-person level

We tested interactions between dependency and self-criticism at both the within- and between-person level of analysis. However none of these interactions was significant. Results are presented in the table below.

Table 4 – Supplemental Materials

Interactions between dependency and self-criticism at both the within-person and between-person level.

	Need satisfaction	Need frustration	Depression
Within-person level			
Dependency	-0.27***	0.20***	0.19***
Self-criticism	-0.16***	0.41***	0.23***
Interaction	0.000	0.003	0.002
Between-person level			
Intercept	4.32	1.19	-0.45
Dependency	-0.16	0.19***	0.26***
Self-criticism	-0.05	0.27***	0.12
Interaction	-0.001	0.01	0.10

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