Reciprocal Effects among Perceived Support, Motivational Regulation and Accountancy Competence: A Longitudinal Study

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Theoretical Background

The analysis of reciprocal effects between the characteristics of learning environment (i.e., provided autonomy) and students' characteristics (i.e., intrinsic motivation) represents a current topic in educational research. Few studies have examined the reciprocal relationships between **teachers' support of students' psychological needs** (Deci & Ryan, 1985) and **students' behavior, emotions** and **performance** (Skinner & Belmont, 1993; Jang, Kim, & Reeve, 2012). However, there are no longitudinal studies that have examined the effects of **students' motivational regulation on teachers' behavior** (i.e., the support of students' psychological needs; Pelletier, Séguin-Lévesque, & Legault, 2002). Therefore, the aim of the current study was to analyze these effects by testing the assumptions of the **Motivation Mediation Model** (Figure 1) at upper secondary level in Austria.

Method & Data Analysis

Participants: 358 students of Austrian Commercial Colleges (age: M_{T1}=15.4, SD_{T1}=0.74, 76 % female)
Measures at **T1** (grade 9) and **T2** (grade 10):
- **Students' perception of volitional functioning support (VFS)** α_{T1}= .89, α_{T2}= .83
- **Academic Self-regulation Questionnaire (SDI**; Ryan & Connell, 1989) α_{T1}= .87, α_{T2}= .85
- IRT-based test to measure **students' competence in Accountancy (Wissensüberprüfung zu Basiskenntnissen der Buchhaltung, WBB**; Helm 2014) α_{T1}= .91, α_{T2}= .80

Measurement invariance over time: χ^2 = 144.20, df = 46, χ^2/df = 3.13, CFI > .98, TLI = .97, RMSEA = .056; ΔCFI = .001, ΔRMSEA = .003, ΔTRd^2 = 5.61, Δdf = 5, p = .346
Analyses are done with Mplus COMPLEX in order to account for the hierarchical structure of the data.
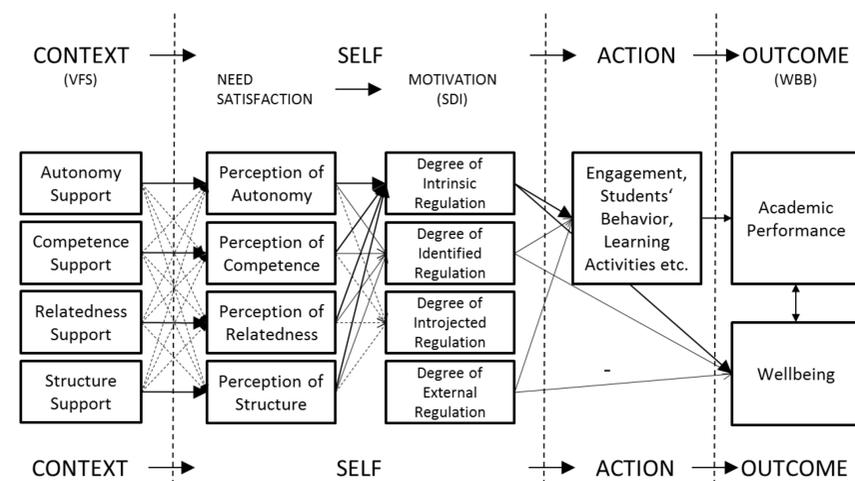
The Motivation Mediation Model

Figure 1: Motivation Mediation Model

Table 1: Fit Indices for Nested Models

| Model	Modeltest	χ^2	df	χ^2/df	CFI	TLI	RMSEA	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA	ΔTRd^2-Test (p value)
1 Stability Model		230.28	92	2.50	.963	.952	.048					
2 Causality Model	M1-M2	219.35	89	2.46	.965	.954	.047	10.94	3	-.002	.001	.007
3 Reverse Causality Model	M1-M3	218.31	89	2.45	.966	.954	.047	11.98	3	-.003	.001	.006
	M2-M3							1.04	0	-.001	.000	n.a.
4 Full Reciprocity Model	M1-M4	211.37	86	2.46	.967	.954	.047	18.91	6	-.004	.001	.003
	M3-M4							6.94	3	-.001	.000	.074
	M2-M4							7.98	3	-.002	.000	.045

Cross-Lagged Effects
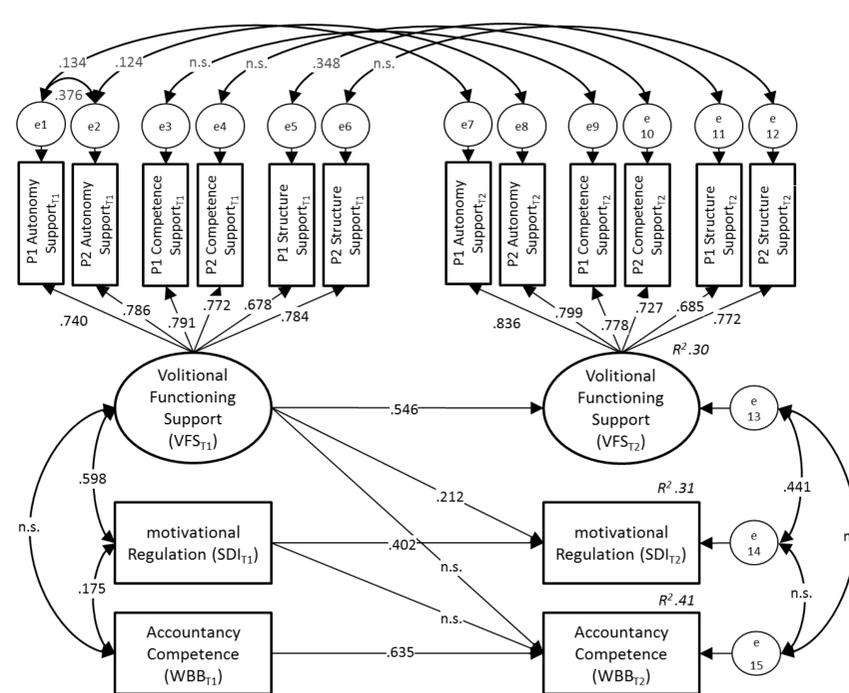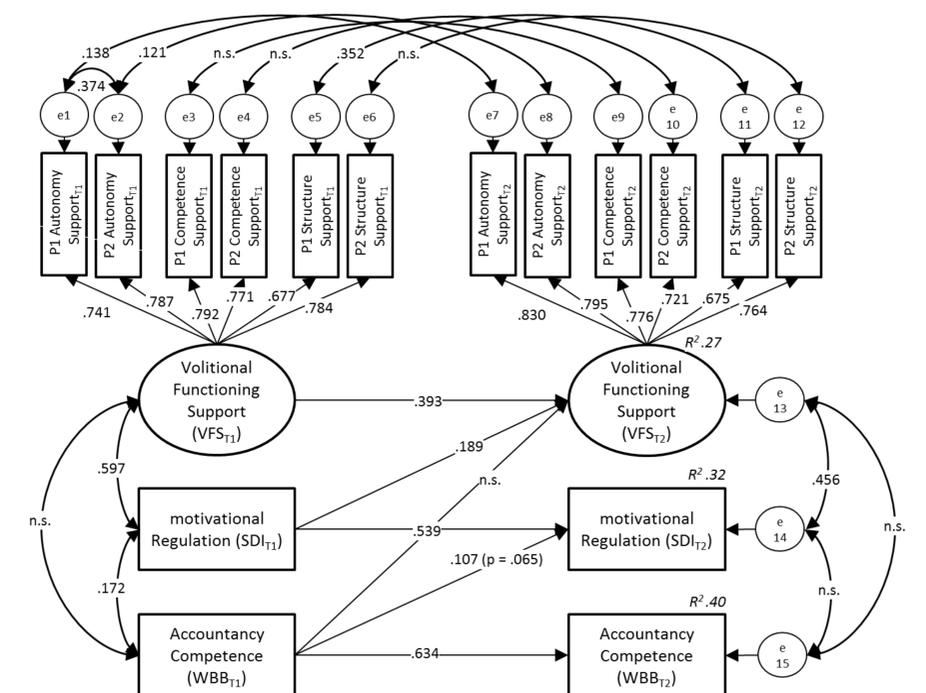

Figure 2: Causality Model

Figure 3: Reverse Causality Model

Results & Discussion

Baseline/Stability Model: The comparison of within-wave correlations over time showed that the relation between students' motivational regulation and their competence in Accountancy has diminished. Between-wave correlations indicated that (1) teachers' support of the students' basic needs (VFS) and students' motivational regulation (SDI) are more state-like than trait-like and (2) students' Accountancy competence (WBB$_{T2}$) is strongly influenced by their prior knowledge (WBB$_{T1}$). Furthermore, there is a strong relation between VFS and SDI within each wave, whereas WBB is not related to both of them.

According to Table 1, the causality model fits the data just as well as the reverse causality model.

The causality model shows that VFS$_{T1}$ significantly predicted SDI$_{T2}$, whereas SDI$_{T2}$ did not significantly correlate with WBB$_{T2}$, indicating that there is no mediation effect of SDI$_{T2}$. Furthermore, WBB$_{T2}$ is neither influenced by the VFS$_{T1}$, nor by the SDI$_{T1}$. The reverse causality model indicates that SDI$_{T1}$ significantly predicted VFS$_{T2}$, while WBB$_{T1}$ had only a marginally significant effect on SDI$_{T2}$ and no effect on VFS$_{T2}$. However, WBB$_{T1}$ had an indirect effect on VFS$_{T2}$, indicating a mediation effect of SDI$_{T2}$.

The diminishing correlation between SDI$_{T2}$ and WBB$_{T2}$ is in accordance to the assumptions of the Stage Environment Fit Theory (Eccles & Midgley, 1988), that over time the gap between students' psychological needs and teachers' support increases due to a more controlling learning environment. Further research should investigate whether the objectively measured teachers' support of students' needs changes over time and how this influences students' characteristics.