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Identifying motivational profiles among VET students: differences in self-efficacy, test anxiety and perceived motivating teaching

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ABSTRACT

There are indicators that a substantial number of students in vocational education and training (VET) experience problems with successfully building their careers. This is often attributed to VET students' motivation. The present study provides insight into VET students' motivational profiles based on self-determination theory. Additionally, differences between those motivational profiles in terms of self-efficacy, test anxiety and perception of motivating teaching were investigated. The study involved 195 VET students, from one VET college in the Netherlands. Using latent profile analyses, four motivational profiles were identified that differed with respect to quality and quantity of motivation. Profiles with higher quality (25%) and higher quantity (27%) of motivation were related to higher levels of self-efficacy and perceived motivating teaching compared to profiles with low quantity (7%) or low quality (41%) of motivation. Furthermore, students in the profile with high-quality motivation reported the lowest levels of test anxiety. Additionally, our findings suggest there is indeed a relatively large group of VET students (48%) who actually experience motivational problems. Practical implications and directions for future research are discussed.

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Introduction

In the Netherlands, almost half a million students engage in vocational education and training (VET). For these students, VET serves as a stepping stone towards future labour market careers or higher education (de Bruijn, Billett, and Onstenk 2017). Within different countries, students seem to struggle making a smooth transition to VET (Billett et al. 2010; Brahm, Euler, and Steingruber 2014; Vugteveen et al. 2016; White and Laczik 2016). In addition,

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studies worldwide show that several VET students experience problems to persevere which could severely impact their opportunities in successfully building their careers. Similar findings have been reported for the Netherlands, with the highest share of dropout (80%) being reported within senior secondary vocational education (VET) (Bussemaker 2016). About half of these students quit school during their first year in VET, after finishing preparatory secondary vocational education (Elffers 2011). Low intrinsic motivation of VET students is often mentioned as a major cause of these problems (Vugteveen et al. 2016). Yet, surprisingly little research has been conducted into students' actual motivation for VET and how this is related to their experiences of the educational context (van der Veen et al. 2014). As students have very heterogeneous reasons for studying in VET, there may be subgroups of students that struggle more with their motivation to persist in VET than others.

For the majority of adolescents, studying is probably not at the top of their priority list. Most adolescents are more strongly focused on activities outside the learning context (e.g. peers, romantic relationships), and this is not different among VET students (Allen and Loeb 2015; Brown 1999). The question then is why VET students in particular may be less interested in their study? This may be related to the specific problems VET students experience in their educational context. First, it is more likely that VET students lost confidence in their capabilities (Fuller and Macfadyen 2012; Glaesser 2006; Groeneveld and van Steensel 2009), because throughout their school career they typically belonged to the lower achieving group (Peetsma and van der Veen 2015). This could ultimately result in lower self-efficacy (Fuller and Macfadyen 2012; Glaesser 2006; Groeneveld and van Steensel 2009) and higher anxiety about testing (Rozendaal, Minnaert, and Boekaerts 2003). Besides experiences in their prior school careers, it seems important to investigate how VET students experience their current teaching context. Prior studies indicate that students' perceptions of their teachers are related to students' motivation and as such an important aspect within students' educational context (Vallerand, Fortier, and Guay 1997; Maulana, Opdenakker, and Bosker 2016; Stroet, Opdenakker, and Minnaert 2015; Vansteenkiste et al. 2009).

The aim of the current study was to examine if there are distinct groups of VET students with specific motivational profiles. Additionally, we examined if these groups differed in their levels of self-efficacy, test anxiety and how they perceived their teachers' motivating teaching, as part of their educational context. This knowledge could indicate if there are specific groups of students that may need additional support and may be used to advise VET colleges how to (better) foster students' motivation.

Motivation and motivational profiles

Motivation is certainly a multi-determined construct (Cook and Artino 2016). In order to support VET schools in their efforts to foster their students' motivation, a focus on those aspects of motivation that are open to direct influence of schools and teachers is important. Self-determination theory (SDT) provides a valuable and well-validated framework for investigating students' motivation. SDT distinguishes six types of motivational regulations, ranging from amotivation to self-determined forms of motivation (Ryan and Deci 2000, 2017). Amotivation is the least self-determined form of motivation, and is basically characterised by a complete lack of learning motivation (Prenzel, Kramer and, Drechsel 2002). Amotivated students refrain from studying for reasons ranging from indifference to apathy. External regulation refers to behaviours that are initiated and controlled by external contingencies of reward and punishment. A student who studies because he/she is obligated by government constitutes an example of external regulation. When a student has introjected reasons for studying, he/she feels internally pressured to engage in learning activities (Vansteenkiste et al. 2009). For example, a student may feel pressured to put effort into a task to obtain feelings of pride and self-aggrandisement. We speak about identified regulation when students find personal meaning and value in studying (Vansteenkiste et al. 2009). A student who attends the theoretical classes because he/she really wants to become a nurse illustrates identified regulation. Integrated regulation occurs when the activity is congruent with other more deeply anchored values, commitments and interests of a student (Ratelle et al. 2007). These students' reasons for studying are inherent to their identity as students: it is part of their nature. Finally, the last type of regulation is intrinsic motivation, which entails studying for reasons that are inherent to the activity such as satisfaction and enjoyment (Ratelle et al. 2007). An intrinsically motivated student goes to school out of sheer enjoyment and interest. In SDT, external and introjected regulation are considered two types of controlled motivation because they are both related to feelings of pressure to engage in the activity, while identified regulation, integrated regulation and intrinsic motivation are forms of autonomous motivation, because students willingly put effort into the task.

Prior research has shown that controlled motivation predicts negative outcomes such as school dropout (Vallerand, Fortier, and Guay 1997), low school achievement (Barkoukis et al. 2014; Soenens and Vansteenkiste 2005), high test anxiety and more procrastination (Vansteenkiste et al. 2009). In contrast, a variety of positive outcomes have been associated with autonomous motivation (for a review, see Stroet, Opdenakker, and Minnaert 2013), including, but not limited to, low dropout rates (Hardre and Reeve 2003; Vallerand, Fortier, and Guay 1997), increased persistence (Vallerand and Bissonnette 1992) and higher academic performance (Barkoukis et al. 2014). In general, it is well established that controlled motivation is related to poorer

outcomes, whereas autonomous motivation is related to more optimal outcomes. Naturally, there will be inter-individual variability between VET students' motivation for studying; some students study predominantly because they want to pursue a particular career (autonomous), others because they feel obliged (controlled). Moreover, students' motivation to study can consist of various gradations on the motivational spectrum. There may be subgroups of students that combine both autonomous and controlled reasons to study, while others may study predominantly out of autonomous or controlled reasons. As such there may be different combinations of motivational regulations resulting in personal profiles, which can be identified using a person-centred approach.

In earlier work, using a sample of secondary school students and a sample of college students, Vansteenkiste et al. (2009) detected four different motivational profiles: (1) overall high scores on autonomous and controlled motivation (high quantity); (2) low scores on both autonomous and controlled motivation (low quantity); (3) high scores on autonomous motivation and low scores on controlled motivation (high quality); and (4) high scores on controlled motivation and low scores on autonomous motivation (low quality). Similar clusters were found in other studies among secondary school students (Henderlong et al. 2016; Ratelle et al. 2007), middle school students (Hayenga and Corpus 2010) and college students (Ratelle et al. 2007).

Following this type of person-centred approach, studies have demonstrated that students within the high-quality profile show the most favourable outcomes, such as higher persistence, lower test anxiety and higher academic functioning (Hayenga and Corpus 2010; Ratelle et al. 2007; Vansteenkiste et al. 2009). In contrast, students within the low-quality group showed a less desirable pattern of outcomes, including work avoidance, concerns about others' approval, lack of personal autonomy (Henderlong et al. 2016), cheating and poor performance (Vansteenkiste et al. 2009). Outcomes for students in the high- and low-quantity profiles usually fall between the high-quality and low-quality profiles. Students in the high-quantity profile typically show less optimal outcomes than students in the high-quality profile, even though they have high levels of autonomous motivation (Hayenga and Corpus 2010; Henderlong et al. 2016; Ratelle et al. 2007; Vansteenkiste et al. 2009), whereas students in the low-quantity group sometimes outperform the low-quality students (Vansteenkiste et al. 2009). Wormington, Corpus, and Anderson (2012) found a slightly different pattern in students' outcomes over the different motivational profiles. They found that students within the high-quality and high-quantity profiles seemed equally favourable. Furthermore within their study, the low-quality profile outperformed the low-quantity profile.

Overall, these studies demonstrate that the high-quality profile displays the most adaptive pattern of student outcomes, whereas the low-quality profile shows the least adaptive pattern.

Self-efficacy and test anxiety

Throughout their school careers, VET students in the Netherlands typically belong to the lower achieving group and usually attended the lower tracks of secondary school (Peetsma and van der Veen 2015). Related to students' motivation, research has shown that VET students often perceive themselves as academically inadequate (Fuller and Macfadyen 2012), have a lower sense of self-efficacy (Fuller and Macfadyen 2012; Groeneveld and van Steensel 2009) and report higher levels of test anxiety (Rozendaal, Minnaert, and Boekaerts 2003). This indicates that students' expectancy about whether they are able to do well at school (i.e. self-efficacy) and their fear of failure with regard to test performance (i.e. test anxiety) are closely associated with their motivation to study (Pintrich and de Groot 1990). Therefore, to provide schools and teachers with a genuine insight into the motivation of this target group, it is necessary to investigate whether students within different motivational profiles might also show related differences with regard to self-efficacy and test anxiety.

Motivating teaching

Teachers interact with students on a daily basis and as such have a central role in fostering students' motivation (Maulana, Opdenakker, and Bosker 2016; Stroet, Opdenakker, and Minnaert 2015). Specifically, SDT poses that students' autonomous motivation will be enhanced when their basic psychological needs for autonomy (i.e. experiencing a sense of volition and psychological freedom), competence (i.e. feeling effective) and relatedness (i.e. experiencing a sense of closeness and friendship) are fulfilled (Ryan and Deci 2000). Applying this to the context of teaching indicates that motivational teaching consists of offering autonomy support (autonomy), providing structure (competence) and being relatedness supportive (relatedness).

Students perceive their teacher as autonomy-supportive when they are provided with a desirable number of meaningful choices (Mouratidis and Michou 2011) and are allowed to take the initiative (Jang, Reeve, and Halusic 2016) and to explore assignments for themselves before support is offered (Haerens et al. 2013). Prior studies show that students' perceptions of autonomy support are related to higher autonomous motivation (Soenens and Vansteenkiste 2005) and less test anxiety (Sierens 2010). According to SDT, the provision of structure is assumed to nurture students' need for competence (Ryan and Deci 2017). Teachers who provide structure communicate clear expectations and guidelines to students, give meaningful instructions, frame upcoming lessons well, provide desired help and guidance during activities (Haerens et al. 2013; Jang, Reeve, and Deci 2010; Stroet, Opdenakker, and Minnaert 2013), are encouraging and provide positive informational feedback during and after task completion (Stroet, Opdenakker, and

Minnaert 2013). In an extensive literature review, Stroet, Opdenakker, and Minnaert (2013) demonstrated that structure is positively associated with autonomous motivation. Finally, teachers' involvement is assumed to foster students' need for relatedness (Ryan and Deci 2017). Involved teachers demonstrate sincere concern and provide warmth and unconditional regard (Connell and Wellborn 1991). Stroet, Opdenakker, and Minnaert's (2013) review demonstrates a consistent positive association between teachers' involvement and students' autonomous motivation.

In sum, research indicates that students who perceive their teachers as motivating will more likely study because of inherent enjoyment (i.e. intrinsic motivation) or personal value (i.e. identified regulation) rather than because they feel either externally or internally pressured to do so (i.e. controlled motivation) (Haerens et al. 2015). This suggests that students in different motivational profiles could also display differences in their perceptions of motivating teaching; autonomy support, structure and involvement.

The present study

The overall aim of the present study was to gain more insight in VET-students' motivational profiles and how these profiles are related to students' experiences of their educational context, thereby addressing two research questions.

(1) Which motivational profiles best describe VET-students' motivation?

While most of the SDT studies on motivational profiles make use of composite scores for two scales, controlled and autonomous motivation, analyses based on the individual regulations might reveal differences in profiles and related outcomes. Howard et al. (2016) found slightly different profiles in a sample of working adults: amotivated, balanced, autonomously regulated and highly motivated. From these profiles, participants in the highly motivated and autonomously regulated profiles reported superior work performance and higher levels of well-being, while the amotivated profile fared the worst (Howard et al. 2016). Considering the whole range of behavioural regulations instead of using two composite scales could provide important additional information; therefore, in this study, we use individual regulations to investigate students' motivational profiles.

Consistent with prior research, we expected to identify at least four motivational profiles similar to the high quality, low quality, high quantity and the low quantity profile as found by Vansteenkiste et al. (2009). As the population of VET students is often described as having poor intrinsic motivation, we expected to find a relatively large number of students in a profile with predominantly high levels of introjected and external regulation.

- (2) *Do students in different motivational profiles differ in their experience of their educational context (self-efficacy, test anxiety and motivating teaching)?*

Based on most prior research, we expected a relationship between belonging to the high-quality profile and more positive experiences of the educational context. In contrast, we expected belonging in the low-quality profile to be related to more negative experiences of their educational context. The high-quantity profile and low-quantity profile were expected to be in between, with somewhat more positive associations for the high-quantity profile and more negative association for the low-quantity profile (Hayenga and Corpus 2010; Henderlong et al. 2016; Ratelle et al. 2007; Vansteenkiste et al. 2009).

Method

Participants

In the Netherlands, the largest group of students starts vocational education around the age of 16 after finishing lower secondary vocational education. VET encompasses about 42% of the total student population in Dutch post-secondary education (Dutch Ministry of Education, Culture and Science 2013), which is above the European average (CEDEFOP 2017). The present study was conducted in one VET college in the eastern part of the Netherlands. This VET college took part in this study because its board looked for policy input to foster students' motivation. The VET college is a midsized institute that educates almost 9000 students and offers about 40 different tracks.

We took a convenience sample of students who were enrolled in the following tracks: Basic Care and Welfare (level 2)¹ and Social Cultural Work and Pedagogical Work (level 4). In total, 195 students participated, divided over 13 classes, and attached to four different teams of teachers ($n = 53$). Of the participating students, 76.4% ($n = 149$) were female; the age of the students ranged from 15 to 27, with an average of 17.8 years ($SD = 1.78$). When asked about their cultural ethnic background, 83.2% of the students reported that their father was Dutch and 85.2% of the mothers were Dutch. Parental country of birth, other than the Netherlands, varied from European countries (3.5% fathers, 2% mothers) to Morocco and Angola (1% fathers, 1% mothers), Asia, mostly Middle Eastern countries (8.6% fathers, 8.8% mothers), Suriname and the Dutch Antilles (3.1% fathers, 1% mothers).

Procedure

The study was conducted in the second part of the first year, considering it to be a 'sensitive period' in terms of dropout (Elffers 2011). Additionally, students

know their teachers by then and have a good sense of their teachers' motivating teaching. Students in the 13 different classes received an invitation to participate in the study and were asked to inform us if they did not wish to participate (passive consent). When students were under the age of 18, parents received the same information. No students or parents withheld their consent for participation. However, not all students were present in the classroom when they were scheduled to fill in the questionnaires. The teams that worked with fixed classes (combining 178 out of the 195 participants) had a response rate of 76.07%. One team did not work with fixed classes and hence response rates could not be calculated. A total of 17 out of the 195 participants did not indicate their class. Six participants choose not to reveal their age, and three did not indicate their parental birth country. The questionnaires were designed such that participants could only proceed to the next question after they had provided an answer, which prevented missing data.

Students were asked to fill out an online questionnaire with the survey tool in Google Drive, which took about 15 minutes to complete. Teachers were instructed to refrain from looking at the screens and only to respond to students if they had difficulties understanding the questions. Students were assured that their data would be handled anonymously.²

Measures

Motivation

Students' motivation was measured with the Academic Self-Regulation Scale (SQR-A) (Ryan and Connell 1989) adjusted for higher education and translated into Dutch by Vansteenkiste et al. (2009). Students responded to statements about their reasons for studying on a scale from 1 (not important at all) to 5 (very important). The SQR-A consists of four subscales with four items each: external regulation (e.g. 'I study because I'm supposed to do so'; $\alpha = 0.76$), introjected regulation (e.g. 'I study because I would feel guilty if I did not do so'; $\alpha = 0.84$), identified regulation (e.g. 'I study because I want to learn new things'; $\alpha = 0.87$) and intrinsic motivation (e.g. 'I study because it's fun'; $\alpha = 0.87$). Each scale was created by averaging the scores on the items, which showed good internal consistency.

Although SDT distinguishes six types of regulation, we focused on just four of them, excluding amotivation and integrated regulation. Amotivation was omitted because we were interested in students' intentions for going to school and amotivation is characterised by a general lack of intention and motivation. Integrated regulation was excluded because it requires a fully developed identity, which is unlikely given the fact that the majority of the participants (76%) are adolescents and thus in the midst of their identity formation (Ryan and Connell 1989).

Self-efficacy and test anxiety

Self-efficacy and test anxiety were measured with the Motivated Strategies for Learning Questionnaire (Pintrich and de Groot 1990). Students were asked to answer questions about how they approach their study on a scale from 1 (completely not true for me) to 7 (completely true for me). The subscale self-efficacy for learning and performance consists of eight items (e.g. 'I'm certain I can master the skills being taught in this track'; $\alpha = 0.90$). The subscale test anxiety includes five items and refers to worries, negative thoughts and affective, physiological arousal aspects of anxiety (e.g. 'When I take tests, I think of the consequences of failing'; $\alpha = 0.83$).

Perceived motivating teaching

Students' perceptions of their teachers' motivating teaching were measured with the Dutch shortened version of the Teacher as Social Context Questionnaire (TASCQ; Belmont et al. 1988). Students in VET schools are taught and thus motivated by a team of different teachers. Therefore, this study explores how students perceive the motivating teaching of their teacher team in general.

Ideally, students would have filled out the questionnaire for each individual teacher in their team (5–10 in each team), yet this would have been too demanding for students. In other studies, often one individual teacher (like the teacher for Dutch or math) is selected, yet we did not prefer to do so given that we were interested in students' general perceptions of their experiences at school. The following subscales, each consisting of eight items, were used: autonomy support (e.g. 'My teachers give me a lot of choices about how I do my schoolwork'; $\alpha = 0.73$), structure (e.g. 'My teachers show me how to solve problems for myself'; $\alpha = 0.67$) and involvement (e.g. 'My teachers really care about me'; $\alpha = 0.79$). All items were answered on a 5-point scale ranging from 1 (completely disagree) to 5 (completely agree). To calculate the scale scores, all ratings of the negatively formulated items were reverse coded and the scores on the items of each scale were averaged. Because of the high inter-correlations between the scales ($0.62 < r < 0.74$; see Table 1), we created a composite perceived motivating teaching scale ($\alpha = 0.83$) by averaging the scores for perceived autonomy support, structure and involvement.

Analyses

To answer the first research question, we used latent profile analysis (LPA) to identify VET students' motivational profiles. Compared to other cluster methods, latent profile analysis offers more indicators to evaluate how many groups best describe the data (Howard et al. 2016). The analysis was performed in Mplus using the scores on external regulation, introjected regulation, identified regulation and intrinsic motivation. Bayesian

Table 1. Means and standard deviations of the study variables as a function of level, gender and track.

	N	Motivation				Educational Context				
		External Regulation	Introjected Regulation	Identified Regulation	Intrinsic Motivation	Test Anxiety	Self-Efficacy	Autonomy Support	Structure	Involvement
Level of Education										
Level 2	109	2.60 (.90)	2.85 (1.11)	3.83 (.83)	2.83 (.95)	3.85 (1.46)	4.91 (.91)	3.38 (.67)	3.36 (.56)	3.50 (.68)
Level 4	86	2.49 (.87)	2.65 (1.05)	3.94 (.95)	3.01 (.95)	3.31 (1.28)	5.11 (.95)	3.50 (.59)	3.36 (.59)	3.42 (.50)
Gender										
Male	46	2.61 (.89)	2.94 (1.08)	3.90 (.94)	3.15 (.76)	3.57 (1.32)	5.06 (.98)	3.46 (.55)	3.40 (.58)	3.52 (.70)
Female	149	2.53 (.88)	2.70 (1.10)	3.81 (.87)	2.83 (.99)	3.62 (1.43)	4.98 (.92)	3.43 (.66)	3.35 (.56)	3.44 (.60)
Track PW ^a	52	2.55 (.85)	2.52 (1.01)	3.94 (1.04)	2.88 (1.04)	3.21 (1.14)	5.09 (.88)	3.57 (.54)	3.38 (.51)	3.35 (.50)
BCW ^b	109	2.60 (.90)	2.85 (1.11)	3.83 (.83)	2.83 (.95)	3.86 (1.45)	4.90 (.90)	3.38 (.67)	3.36 (.56)	3.50 (.68)
SW ^c	35	2.40 (.86)	2.82 (1.10)	3.96 (.81)	3.17 (.78)	3.42 (1.46)	5.18 (1.08)	3.45 (.69)	3.37 (.70)	3.53 (.60)
Total	195	2.55 (.88)	2.76 (1.09)	3.88 (.88)	2.91 (.95)	3.61 (1.40)	5.00 (.93)	3.44 (.63)	3.36 (.57)	3.47 (.63)

Note. Track: ^a Pedagogical work; ^b Basic care and welfare; ^c Social work. Values in parentheses are standard deviations.

information criterion (BIC), adjusted Bayesian information criterion (ABIC) and Akaike information criterion (AIC) were used to determine the optimal number of profiles. According to Nylund, Asparouhov, and Muthén (2007), the lower these criteria are, the better the model fit is. In addition, entropy gives an indication of the precision with which cases are classified into the profile, with values closer to 1 indicating a better classification (Celeux and Soromenho 1996). Furthermore, we analysed the p -values of the bootstrap likelihood ratio test (BLRT), as this has been proved more reliable (Nylund, Asparouhov, and Muthén 2007), pointing to a better fit of the model compared to a model with one group fewer. The Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR) and the Lo-Mendell-Rubin likelihood ratio test (adj. LMR) have the same purpose as the BLRT and are also reported. Models of one to eight profiles were estimated using the maximum likelihood ratio (MLR).

To answer the second research question, profile membership was used in a multivariate analysis of variance (MANOVA). Through *post hoc* tests we examined differences between the motivational profiles (independent variable) with regard to perceived motivating teaching, self-efficacy and test anxiety (dependent variables).

Results

Descriptive statistics

Means and standard deviations of the study variables are presented in Table 1.

Inspection of the means shows that external, introjected and intrinsic motivation are just above the mid-range of the scale, while identified regulation is more towards the high range of the scale. The means for the scales of test anxiety and self-efficacy showed scores in the mid-range of the scale. Moreover, means on the dimensions of motivating teaching seem to indicate that, overall, students rated motivating teaching in the mid to high range of the scales.

Using ANOVA, we explored whether there were mean differences in the study variables as a function of age, gender, level of education and track. For age, the results showed a small significant difference for identified regulation ($F(11,177) = 1.88, p = .045$). Regarding gender, results showed only one significant difference between the groups, with male students ($M_{male} = 3.15, SD = 0.76$) reporting to be significantly more intrinsically motivated to study ($F(1,193) = 3.94, p = .049$) than female students ($M_{female} = 2.84, SD = 0.99$). For level of education and type of track, no significant mean level differences were found.

Identified regulation and intrinsic motivation were positively associated with each other as well as with almost all the variables, except for non-significant negative relation with test anxiety (see Table 2). Introjected regulation only showed

Table 2. Correlations among Study Variables.

Variables ^a	1	2	3	4	5	6	7	8
<i>Motivational regulations</i>								
1. External regulation								
2. Introjected regulation	.56**							
3. Identified regulation	-.03	.11						
4. Intrinsic motivation	-.03	.19*	.48**					
<i>Educational context</i>								
5. Autonomy support	-.19**	-.07	.37**	.21**				
6. Structure	-.19**	-.04	.49**	.29**	.74**			
7. Involvement	-.04	.07	.44**	.34**	.63**	.70**		
8. Test anxiety	.21**	.22**	-.13	-.08	-.28**	-.18*	-.13	
9. Self-efficacy	-.14*	.02	.62**	.37**	.43*	.43**	.42**	-.25**

Note. * $p < .050$, ** $p < .010$. A mean of the motivational regulations is significantly different from another mean if they have different superscripts. ^aScales for variables 1–7 ranged from 1 to 5 and for variables 8–9 ranged from 1 to 7.

a significant positive relationship with test anxiety and external regulation. Lastly, external regulation showed significant negative associations with autonomy support, structure and self-efficacy, and a positive correlation with test anxiety. All associations were in the low to mid-range.

Motivational profiles

Latent Profile Analyses (LPA) on all four motivational regulations revealed that the four-cluster solution came out as most optimal since the BIC was lowest, the adjusted BIC was lower than with three clusters, and the BLRT value was significant (see Table 3).³

Figure 1 displays the z-scores for each of the subscales of motivation for the four different profiles. The first profile (25% of the students) was labelled the 'high quality' profile. Students in this profile had relatively high levels of identified regulation and intrinsic motivation and relatively low levels of external and introjected regulation. The second profile (41% of the students) was the 'low quality' profile, characterised by relatively low levels of identified

Table 3. Fit Statistics of Latent Profile Analysis for Students' Motivational Profiles.

Number of clusters	N per cluster	BIC ^a	ABIC ^b	AIC ^c	Ent	VLMR ^d	LMR ^e	BLRT ^f
1	195	2170.04	2144.70	2143.86	Na	Na	Na	Na
2	75,120	2110.39	2069.20	2067.84	.76	.067	.062	<.001
3	23,125,47	2097.62	2040.60	2038.70	.80	.086	.092	<.001
4	49,14,53,79	2085.28	2012.42	2010.00	.78	.063	.068	<.001
5	43,14,63,43,32	2091.36	2002.66	1999.71	.77	.200	.212	.013
6	14,1,67,43,33,37	2094.52	1989.98	1986.51	.82	<.001	<.001	<.001
7	61,10,34,27,1,42,20	2103.37	1982.99	1979.00	.82	.716	.722	.250
8	12,7,1,20,19,32,16,88	2115.73	1979.51	1974.99	.84	.391	.394	<.001

Note. ^aBayesian information criterion (BIC); ^badjusted Bayesian information criterion (ABIC); ^cAkaike information criterion (AIC); ^dVuong-Lo-Mendell-Rubin likelihood ratio test (VLMR); ^eLo-Mendell-Rubin likelihood ratio test; ^fbootstrap likelihood ratio test (BLRT).

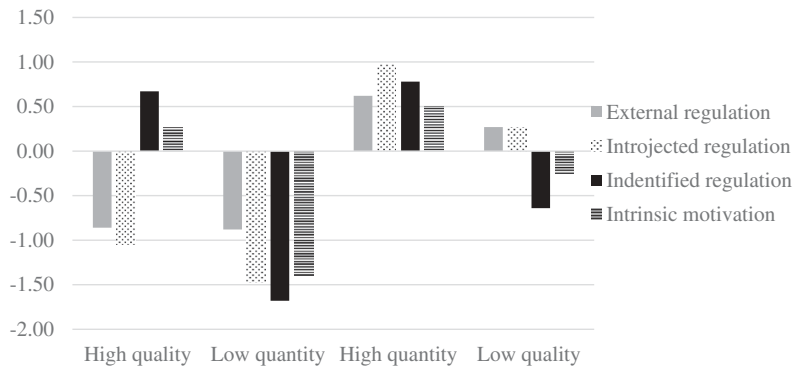


Figure 1. Z-scores for motivational regulations of the four-cluster solution.

regulation and intrinsic motivation, and relatively high levels of external and introjected regulation. The third profile, the 'high quantity' profile (27% of the students), was characterised by relatively high scores on all subscales. The fourth profile was named the 'low quantity' profile (7% of the students). These students showed relatively low levels on each of the four types of regulation.

MANOVA showed the differences in levels of the individual regulations between the motivational profiles. Post hoc Tukey analyses revealed that identified regulation ($\eta^2 = 0.65$) and introjected regulation ($\eta^2 = 0.72$) specifically differentiate between the different motivation profiles. A chi-squared test was used to examine whether there was any relationship between students' gender, age and their profile. No significant relationship was found for gender ($\chi^2(3) = 2.20, p = .532$) and age ($\chi^2(33) = 41.71, p = .142$), indicating that they were not related to profile membership. Therefore, we did not control for gender or age in subsequent analyses.

Differences between students within motivational profiles

To investigate differences between the profiles in terms of self-efficacy, test anxiety and perceived motivation (teachers' autonomy support, structure and involvement), a MANOVA was conducted. Results revealed significant differences between the profiles for self-efficacy ($\eta^2 = 0.30$), test anxiety ($\eta^2 = 0.07$); Wilks' lambda = 0.61; $F(15, 516.62) = 6.87, p = > .001$, as well as perceived autonomy support ($\eta^2 = 0.12$), structure and involvement ($\eta^2 = 0.16$) (see Table 4). Across all variables, students in the high-quality profile showed the most optimal pattern of relationships. Belonging to this profile is related to higher levels of perceived self-efficacy and perceived motivating teaching, and the lowest levels of test anxiety. However, there were no significant differences between the high-quality and the high-quantity profile, which also reported more optimal relations with self-efficacy and perceived motivating teaching. Besides that, students in the high-quantity profile did not significantly differ from the low-quality and low-quantity profile in

Table 4. Means scores, standard errors and analysis of variance on all study variables for the motivational profiles.

	High quality (n = 49; 25%)	Low quality (n = 14; 7%)	High quality (n = 53; 27%)	Low quality (n = 79; 41%)	F	η^2
Cluster dimensions (z-scores)						
External regulation	–0.86 (.67) ^a	–0.88 (.82) ^a	0.62 (.86) ^b	0.27 (.82) ^b		
Introjected regulation	–1.05 (.50) ^a	–1.48 (.26) ^b	0.97 (.61) ^c	0.26 (.53) ^d		
Identified regulation	0.67 (.53) ^a	–1.68 (.83) ^b	0.78 (.46) ^a	–0.64 (.66) ^c		
Intrinsic motivation	0.27 (1.05) ^a	–1.39 (.65) ^b	0.50 (.87) ^a	–0.25 (.78) ^c		
Cluster dimensions (raw scores)						
External regulation	1.79 (.59) ^a	1.77 (.72) ^a	3.09 (.76) ^b	2.78 (.72) ^b	38.84	.38
Introjected regulation	1.61 (.55) ^a	1.14 (.29) ^b	3.82 (.67) ^c	3.05 (.58) ^d	165.09	.72
Identified regulation	4.47 (.47) ^a	2.39 (.73) ^b	4.57 (.41) ^a	3.31 (.58) ^c	119.00	.65
Intrinsic motivation	3.17 (1.00) ^a	1.59 (.62) ^b	3.38 (.83) ^a	2.67 (.74) ^c	21.28	.25
Educational context						
Autonomy support ¹	3.74 (.63) ^a	3.21 (.61) ^{bc}	3.53 (.54) ^{ac}	3.23 (.62) ^b	8.55**	.12
Structure ¹	3.64 (.66) ^a	3.04 (.36) ^b	3.52 (.46) ^a	3.15 (.49) ^b	12.42**	.16
Involvement ¹	3.67 (.55) ^a	3.08 (.45) ^b	3.73 (.59) ^a	3.22 (.61) ^b	12.33**	.16
Test anxiety ²	3.06 (1.26) ^a	3.29 (1.74) ^{ab}	3.72 (1.56) ^{ab}	3.93 (1.20) ^b	4.55*	.07
Self-efficacy ²	5.54 (.74) ^a	4.29 (.74) ^b	5.44 (.77) ^a	4.50 (.83) ^b	27.72**	.30

* $p < .005$.

** $p < .001$.

Values in parentheses are standard errors. A profile mean is significantly different from another mean if they have different superscripts. Differences between the profiles were tested with MANOVA followed by a *post hoc* Tukey analysis.

¹Measured on a five-point scale.

²Measured on a seven-point scale.

their relationship with test anxiety, whereas the students in the high-quality profile did. The low-quantity and the low-quality groups showed less favourable relationships, being related to, the lowest levels of self-efficacy, perceived autonomy support, structure and involvement, and higher levels of test anxiety.

Discussion

For many students VET is a good start for building a successful career. Unfortunately, however, several VET students experience problems in their career development. This is often attributed to VET students' poor motivation. Relying on a person-centred approach, the aim of the present study was to gain more insight into VET students' motivation by investigating motivational profiles and differences between these profiles in self-efficacy, test anxiety and perceived motivating teaching.

In this study, students in general reported more identified regulation than intrinsic motivation, which could be because VET students choose a specific track that leads them to their future profession but are still obliged to go to school, making their reasons for studying not completely intrinsic. Identified regulation had a strong positive association with self-efficacy and motivating teaching, which indicates this as an important regulation for positive experiences of the educational context, in line with prior research (Vansteenkiste et al. 2018). Introjected regulation was only positively associated with test anxiety. In this study, external regulation might be the most maladaptive regulation and was associated with lower levels of self-efficacy, perceived autonomy support and structure, and higher levels of test anxiety.

Describing VET students' motivational profiles

Confirming our hypothesis and in line with prior research (Vansteenkiste et al. 2009), four profiles best matched our data to describe VET students' motivational profiles. Specifically, identified and introjected regulation contributed to the formation of these profiles. The high-quality profile contained students who study based on their personal values, interest and enjoyment, and who feel little pressure. The percentage of students falling in this cluster (25%) was similar to that of prior studies with high school and college students ranging between 19% and 36% (Ratelle et al. 2007; Vansteenkiste et al. 2009; Wormington, Corpus, and Anderson 2012). The low-quality profile was characterised by students who study because they feel pressured by others (e.g. parents, friends or teachers) or want to avoid feelings of guilt and shame. As expected, the percentage of students in the low-quality profile (41%) was much higher than that found in other studies, ranging from 5.9% to 27% (Ratelle et al. 2007; Vansteenkiste et al. 2009; Wormington, Corpus, and Anderson 2012). The percentage of students in the high-quantity profile

(27%) was about the same as that found by Vansteenkiste et al. (2009). In contrast, Wormington, Corpus, and Anderson (2012) found a higher percentage of high school students in the high-quantity profile (43%). Students in the high-quantity profile feel pressured to study but are also driven by personal values or interest. The low-quantity profile consisted of students who felt neither pressure nor interest to study. The low-quantity group was much smaller (7%) compared to other studies (25–35%; Ratelle et al. 2007; Vansteenkiste et al. 2009) among high school and college students, but similar to Wormington, Corpus, and Anderson (2012), who reported 11% of high school students to be in this profile.

In sum, our sample of VET students was divided into a large number of students with a low-quality profile, two moderate groups of students, respectively, within the high quality and quantity profile, and a relatively low number of students with low scores on all regulations. These results add to the research confirming these four motivational profiles, but also indicate that there can be distinct differences in the distribution of these profiles within different target groups. Furthermore, as controlled motivation is associated with more negative student outcomes (Barkoukis et al. 2014; Soenens and Vansteenkiste 2005; Vallerand, Fortier, and Guay 1997), the relatively large group of students in this profile could indicate that there is indeed a considerable group of students that is at risk of adverse outcomes, especially in the long run (e.g. drop out, unemployment).

Differences between motivational profiles

As expected, students in the high-quality profile demonstrated the most favourable relations with experiences of the educational context, higher levels of motivating teaching, and perceived motivating teaching and less test anxiety. In contrast, students in the low-quality profile had the poorest experiences. Differences between profiles were most pronounced for the high-quality and the low-quantity profiles (on all variables related to the educational context), and the high-quality and low-quantity profiles, which differed on self-efficacy and perceived motivating teaching but not on test anxiety. The high-quantity profile was between the high quality and the other two groups for perceived autonomy support and test anxiety. These findings are in line with previous research (Hayenga and Corpus 2010; Henderlong et al. 2016; Ratelle et al. 2007; Vansteenkiste et al. 2009) and indicate that fostering autonomous forms of motivation may lead to higher self-efficacy and lower levels of test anxiety. The differences between the high-quantity and the high-quality profiles, however, were far less pronounced compared to prior research. Furthermore, the low-quantity and low-quality profiles seemed to report equally poor experiences, whereas in prior research the low-quality students reported the poorest outcomes. Yet, the lack of differences found in the

current study might be partially due to the fact that the levels of external regulation were not that large in the group that was labelled as low quality. Indeed, external regulation in particular was associated to lower levels of self-efficacy, perceived motivating teaching and more test anxiety, whereas introjected regulation was only positively related to test anxiety. Other authors found similar results as the ones found in our study (Wormington, Corpus, and Anderson 2012) and concluded educational settings with a controlling nature, such as VET, controlled types of motivation may be less maladaptive than in other educational settings that speak more towards students' autonomous motivation. Overall, such findings call for future research to compare whether the meaning of the motivational profiles may differ according to students' educational context.

Limitations and directions for future research

This study is one of the first to describe VET students' motivation by applying latent profile analyses on almost the whole range of behavioural regulations. The current study also has some limitations. Firstly, our research was cross-sectional and therefore prevents us from investigating the directionality of effects. Future research should employ a longitudinal design to analyse whether students' perceptions of motivating teaching influence their motivation, the other way around or both. Furthermore, a longitudinal design with several repeated assessments would allow investigating critical time points at which students become demotivated or even formulate dropout intentions.

Secondly, by asking students to give an opinion on their entire team of teachers, we were unable to investigate differences in the degree of motivating teaching per individual teacher. It is very likely that students have different preferences in terms of teachers and subjects. Hence, further research is necessary to investigate how the motivation of students is linked to the motivating teaching of individual teachers within a team and/or different subjects (for instance, practical versus generic subjects) within the curriculum. This future research may answer questions like: can one motivating teacher in a team or one motivating subject be decisive for students' motivation?

Thirdly, this study was conducted with a relatively small sample of similar tracks within one single institute for vocational education and therefore has limited generalisability to the population of VET students as a whole. Future studies should recruit larger samples of students, across more schools in different regions/countries, as well as different tracks at different levels, to investigate whether the relatively large group of controlled motivated students holds.

Practical implications

The relatively large group of students – almost half of the students – in the controlled motivation profile highlights that there is indeed a group of VET students that might require extra attention to support them in successfully building their careers. One fruitful avenue might be to focus on teachers and how they can apply more motivating teaching behaviour. Intervention studies on applying motivating teaching and more motivating elements in curricula based on SDT (Aelterman et al. 2014; Reeve et al. 2004; van der Veen et al. 2013; White and Laczik 2016) show promising results in terms of fostering students' (autonomous) motivation. As our results suggest that VET students are not a homogenous group but that they are quite diverse in their reasons for studying, it seems important to tailor interventions to fit the motivational needs of different students.

Apart from teachers, it may be important to think about whether curricula and the school climate could also be designed in a more motivating way (Ratelle et al. 2007). Our findings might indicate that schools paying more attention towards fostering students' interest and relevance while refraining from using external pressure (applying more motivating teaching behaviour) could support students to believe in their own abilities. We found that students in the low-quality profile had less faith in their abilities and were more afraid of tests. In addition to supporting teachers in adopting more motivating teaching behaviour, it may be fruitful to re-evaluate the amount of and strong focus on summative assessment currently existent within VET. As self-efficacy and test anxiety are related, more motivating ways of testing, with a stronger focus on students' own development (formative assessment), could increase the belief students have in themselves, further fostering their autonomous motivation (Becker et al 2018; Dubeau, Plante, and Frenay 2017; Gulikers, Runhaar, and Mulder 2018; Meijer 2001).

Conclusion

Within our sample, VET students' motivational profiles were diverse. Many students were autonomously motivated but there was also a relatively large group (41%) which predominantly felt obligated to study. The results of this study demonstrated that controlled motivation, especially external regulation, was related to negative consequences for students, whereas autonomous motivation, especially identified regulation, was related to more positive student outcomes. The large group of students in the controlled motivation profile may require additional attention to build their self-efficacy and reduce their test anxiety with more motivating teaching and assessment. The results further suggest that it may be important for schools to focus on reducing external pressure and to emphasise the personal relevance to foster students' autonomous motivation.

Notes

1. Vocational education in the Netherlands is divided into four levels. For example, in a specific track, these levels correspond to: 1. Assistant employee (care aid), one-year track 2. Employee (supporting in care and welfare), one- to two-year tracks 3. Independent employee (practical nurse), two- to three-year tracks 4. Specialised professional (nurse), three- to four-year tracks.
2. This study was approved by the ethical committee of Radboud University (ECSW2015-1901-285).
3. For six clusters, the adj. BIC improved even more, but the values of the BIC became higher, in addition to the emergence of very small clusters without theoretical significance, making this cluster solution less preferable. For seven or more clusters, the adj. BIC improved even more, but the values of the BIC, BLRT, VLMR and adj. LMR became higher.

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No potential conflict of interest was reported by the authors.

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