Understanding vocational students' motivation for dietary and physical activity behaviours

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Article

Understanding vocational students' motivation for dietary and physical activity behaviors

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Abstract: Unhealthy eating behaviors and low levels of physical activity are a major problem in adolescents and young adults in vocational education. To develop effective intervention programs, more research is needed to understand how different types of motivation contribute to health behaviors. In the present study the Self-Determination Theory is used to examine how motivation contributes to dietary and physical activity behaviors in vocational students. This cross-sectional study included 809 students (mean age 17.8 ± 1.9 years) attending vocational education in the Netherlands. Linear multilevel regression analyses were used to investigate the association between type of motivation and dietary and physical activity behaviors. Amotivation was negatively associated with breakfast frequency and was positively associated with diet soda consumption and high calorie between-meal snacks. A positive association was found between autonomous motivation and water intake, breakfast frequency, fruit intake and moderate-to-vigorous physical activity. Autonomous motivation was negatively associated with the consumption of unhealthy products. Controlled motivation was not associated with physical activity or dietary behaviors. Type of motivation seems to partly explain dietary and physical activity behaviors in vocational students. Autonomous motivation in particular was shown to be associated with healthy behaviors and could therefore be a valuable intervention target.

Keywords: motivation; self-determination theory; diet; physical activity; vocational students

1. Introduction

Unhealthy dietary behaviors and a decline in physical activity level are a major problem in adolescents and young adults [1]. These unhealthy behaviors may lead to a higher risk of non-communicable diseases later in their lives [2-5]. The prevalence of these unhealthy behaviors is not evenly distributed across young people [6,7]. Students attending vocational education have less favorable health practices than students attending higher secondary education [8]. In the Netherlands, many vocational students are overweight, show more sedentary behavior than recommended, do not engage in sufficient physical activity and most of them do not meet the guidelines for fruit and vegetable consumption [9-11].

Most vocational students are in their late adolescence, with ages ranging from 16 to 24 years old. Late adolescence is characterized by many cognitive changes, amongst which are changes in motivational processes [12-14]. It is also a period of transition from adolescence to adulthood in which young people establish independence, adopt lasting health behavior patterns and are at the same time at high-risk to develop obesity, as well as unhealthy dietary habits and physical activity practices [15]. It is therefore highly relevant to promote healthy dietary and physical activity

behaviors among adolescents and young adults, especially among those belonging to a vulnerable target group.

To develop effective intervention programs for vocational students, more research is needed to identify factors that predict the engagement in health behaviors among this population. A wide range of theoretical explanations provide a basis for understanding the determinants of behavior and behavior change [16]. Several studies have reported that successful behavior change maintenance may depend on motives, self-regulation, resources, habits, and environmental and social influences and point out that motivation is a critical factor in supporting healthy dietary and physical activity behaviors [17-20]. As a general theory of motivation, the Self-Determination Theory (SDT) is being applied to study motivation in numerous health care and health promotion contexts [21,22]. SDT distinguishes different types of motivation on a continuum in terms of the degree to which the motivation is (non)self-determined from: amotivation, to controlled motivation, to autonomous motivation [23]. Amotivation is a type of motivation in which an individual does not have any intention to perform a certain behavior. Autonomous motivation describes a self-determined type of motivation. In this type of motivation, behavior is performed for the individual's own sake and the goal is self-satisfaction. The motivation type between amotivation and autonomous motivation is controlled motivation, where the motivation to act is driven by external factors and thus is less self-determined than autonomous motivation. Driving factors can for example include social influences, like friends and family or teachers [23].

Previous studies on type of motivation and health behavior among adults show that high autonomous motivation is a predictor for long-term weight control, exercise adherence and smoking cessation [19,24-26]. In early and mid-adolescence, high autonomous motivation is known to be related to increased fruit and vegetable intake [27]. Furthermore, in Finnish vocational students aged 17-19 years, a higher level of autonomous motivation was related to increased physical activity [28]. In middle-school students aged 12 years and in children and adolescents aged up to 18 years old, similar results have been found [29-31]. Controlled motivation on the other hand shows a weak negative association with physical activity [31]. Moreover, individuals who report amotivation to live healthy, have poor uptake and adherence to health behaviors. They do not see any reason to change their behavior and thus are not likely to implement any changes at all [32]. Studies among young adults show that they recognize the future health benefits of adopting healthier lifestyle behaviors. However they are often not motivated to engage in these behaviors due to poor planning, lack of accountability and overall sense of apathy to engage in healthier lifestyle behaviors [33,34].

The evidence above shows that types of motivation influence the engagement in health behaviors in both (young) adults and adolescents. However, most research on adolescents is focused on either early or mid-adolescence. There is little research on the motivation to make healthy choices of late-adolescents, and of vocational students in particular. Therefore, the purpose of this study is to examine the association between type of motivation and dietary and physical activity behaviors among adolescents and young adults in vocational education.

2. Methods

2.1. Design

In this cross-sectional study data was collected as part of a health promoting intervention, aimed at improving physical activity and dietary behaviors among vocational students, from November 2017 until January 2018. The study was not within the scope of the Dutch Medical Research Involving Human Subjects Act [35] and therefore exempted from review by the Medical Ethics Committee Southwest Holland.

2.2. Study population

The study population consisted of a convenience sample of 809 vocational students studying at three school locations for vocational education in an urban area of the Netherlands. Participants attended seven different vocational education training programs. The following steps were taken to

collect the data. First, program education managers were contacted by the researchers. Based on the program schedule, the managers selected as many first- and second-year classes as possible during a school week. Next, all students attending the selected classes were informed that they could voluntarily participate in the study and that recruitment would take place during class. In class all students received oral and written information before they had to decide to participate by the researchers. After they gave their consent to participate on a digital informed consent form, students completed an online survey.

2.3. Measurements

2.3.1. SDT motivation types

For both diet and physical activity motivation, the Treatment Self-Regulation Questionnaire (TSRQ) was used to determine the participants' self-determination to either eat healthy or to exercise regularly. In total the TSRQ consists of 15 statements: six statements on autonomous motivation, six on controlled motivation and three on amotivation [36]. Participants were asked to rate how true each statement was for them using a 5-point scale. For example, one of the statements for autonomous motivation 'I would eat healthier because I feel responsible for my health' could be scored from 1 (not at all true) to 5 (very true). The responses on the autonomous, controlled and amotivation statements have been averaged to calculate a unit-weighted composite score for each type of motivation. Both TSRQs for diet and exercise were translated from English to Dutch by the researchers.

2.3.2. Dietary behavior

For questions on fruit, breakfast, sweet and savory snacks, water, energy drink and soda consumption the dietary questions of the local health authority's Youth Health Monitor were used [37]. An example question is 'On how many days a week do you consume fruit?'. Eight answer options were given, from never to seven days a week. After this, the question 'How much fruit do you generally eat on those days?' followed. Answer options included 0.5, 1, 1.5, 2, 2.5 and 3 or more pieces of fruit per day. To calculate mean daily fruit consumption the number of days were multiplied with the amount of fruits consumed and divided by seven. A similar calculation was done for the other dietary behaviors, taking into account the frequency of the behavior and the amount consumed. Furthermore, results were compared with the dietary guidelines of the Netherlands Nutrition Centre [38].

2.3.3. Physical activity

Physical activity level was assessed using the validated Short QUestionnaire to ASsess Health-enhancing physical activity (SQUASH), which measures walking and cycling to school or work, activity at work, household tasks, activity in free-time and sports [39]. Participants were asked to report the frequency (days/week) and duration (minutes/day) they engaged in these activities during a normal week. It was necessary to adapt the wording of some questions for the participants to ensure clarity. Physical activity during work was for example changed to physical activity during a side job. The results were converted to minutes per week spent in moderate or vigorous intensity physical activity based on Metabolic Equivalent Tasks (METs) derived from Ainsworth's compendium of physical activity [40]. Physical activity levels were compared with the physical activity guidelines of the Health Council of the Netherlands [41].

2.3.4. Covariates

Covariates that were measured included gender, age, weight status and training level. Previous research has suggested that gender, age, and weight status are of influence in diet and physical activity behaviors [42-44]. Gender was determined as male or female. The participants' birth year was used to determine their age. Their Body Mass Index (BMI) was calculated based on self-reported

height and weight and the international IOTF cut-off points were used to determine their weight status [45]. Because education level in general is associated with a healthier lifestyle [46], it was decided to correct for training level as well. Vocational education in the Netherlands has four different training levels, level one being the lowest and four the highest, these were combined into three groups; level 1 & 2, level 3, and level 4.

2.3.5. Statistical analyses

The analyses included descriptive statistics of the participants. Outliers and missings in the data were explored and, if needed, particpants were removed from the analysis. Due to the hierarchical structure of the data, with 809 students (level 1) clustered within seven vocational education training programs (level 2), we used linear multilevel regression analyses to investigate the associations between type of motivation and physical activity and dietary behaviors. A three-step modeling strategy was employed. The first step comprised identifying the null model or a description of the variance in the dependent variable explained at the two levels as captured by the Intraclass Correlation Coefficient (ICC). The second step involved the inclusion of the motivation type variables. All covariates were added in the third step to produce final models. To investigate the associations between motivation types and the dietary and physical activity variables, the calculated regression coefficients and 95% confidence intervals (CI) were used. An alpha of 0.05 was used to test statistical significance. All analyses were conducted using IBM SPSS version 26.

3. Results

The study population characteristics can be found in Table 1. The mean age of the study population was 17.8 (± 1.9) years old. Most of the sample had a normal weight (75%) and was female (62%). Type of VET education varied, but a large part of the sample followed VET for Lifestyle & Sports (31%). All levels of VET education were represented, but the majority of participants (66%) attended level 4 VET education.

Table 1. Individual characteristics as a Percentage of the Sample (N=809) or Means and Standard Deviations.

Characteristic	%	Mean (SD)
Age (years)		17.8 (1.9)
BMI (kg/m^2)		22.3 (3.5)
Weight status		
Underweight	7	
Normal weight	75	
Overweight	15	
Obese	3	
Gender		
Male	38	
Female	62	
Type of vocational training programme		
Economics & Law	20	
IT	3	
Lifestyle & Sports	31	
Social Work	8	
Beautician	20	
Health Care	7	
Fashion	11	
Training level		
Level 1 & 2	11	
Level 3	23	

Level 4 66

In Table 2 descriptive statistics for dietary and physical activity behaviors can be found. The mean water consumption was 1086 mL/day. For fruit, the mean consumption was 0.9 pieces a day and for diet soda the mean consumption was 133 mL/day. Mean breakfast frequency was 4.7 days per week. The mean number of high calorie snacks (the sum of sugar-sweetened beverages and snacks) was high in the population, with 24 portions per week. The number of minutes of moderate-to-vigorous physical activity (MVPA) varied greatly among the population. The mean time for weekly MVPA was 935 minutes, 161 minutes for vigorous PA and 774 minutes for moderate PA. The percentage of participants meeting the guidelines for physical activity and dietary behaviors is also displayed. Almost all participants met the guideline for diet soda, but only twelve percent met the guideline for fruit consumption. In addition, only a limited percentage of participants met the guideline for a maximum of three high calorie snacks. Overall, 49% met the guideline for MVPA. However a classification by age group shows that 20% of participants younger than 18 years met the recommended level of MVPA (at least 60 minutes MVPA per day) while 79% of participants aged 18 years and over met the adult MVPA guideline of at least 150 minutes MVPA per week.

Table 2. Summary of means and standard deviations, median and interquartile range for dietary and physical activity behaviours and percentage of the sample (N=809) that met the guidelines.

Behaviours	Mean (SD)	Median (IQR)	% Guideline*
Regular soda (mL/day)	330 (431)	143 (0-500)	na
Energy drink (mL/day)	65 (143)	0 (0-71)	na
Diet soda (mL/day)	133 (294)	0 (0-107)	98
Water (mL/day)	1086 (671)	1000 (536-1500)	35
Fruits (pieces/day)	0.9 (2.6)	0.7 (0.3-1.3)	12
High-calorie snacks (portions/day)	1.9 (1.8)	1.4 (0.7-2.6)	8
Breakfast (days/week)	4.7 (2.6)	6.0 (3.0-7.0)	48
Moderate physical activity (minutes/week)**	774 (646)	690 (270-1080)	na
Vigorous physical activity (minutes/week)**	161 (305)	0 (0-270)	na
MVPA (minutes/week)**	935 (708)	840 (420-1260)	49

* The guidelines of the Netherlands Nutrition Centre for dietary behaviours: unsweeted fluid intake 1,5L/day, fruit 2 pieces/day, diet soda max of 4 units of 250mL/day, breakfast 7 times per week. The guidelines of the Health Council of the Netherlands for physical activity behaviours: 150 MVPA min/week for adults and MVPA 60 minutes/day for youth younger than 18. na, not applicable. ** For physical activity behaviors, 2 participants were excluded from the analysis due to unrealistic high scores per week.

The median motivation scores are highest for autonomous motivation for both diet and physical activity (Table 3), followed by controlled motivation and lastly amotivation. Controlled motivation shows higher values for physical activity than it does for diet. Apart from this, scores are similar for diet and physical activity.

Table 3. Summary of means and standard Deviations, median and interquartile range for scores on different types of motivation for diet and physical activity.

Type of motivation	Mean (SD)	Median (IQR)
Autonomous motivation diet	3.7 (0.8)	3.7 (3.2-4.2)
Controlled motivation diet	2.4 (0.7)	2.4 (2.8-3.8)
Amotivation diet	2.2 (0.7)	2.2 (1.7-2.7)
Autonomous motivation physical activity	3.7 (0.8)	3.7 (3.2-4.2)
Controlled motivation physical activity	2.5 (0.8)	2.5 (2.0-3.0)

Amotivation physical activity	2.0 (0.7)	2.0 (1.3-2.7)

Table 4 and 5 show the associations of autonomous motivation, controlled motivation and amotivation with physical activity and dietary behaviors, as determined by multilevel linear regression analysis. For dietary behavior (Table 4), autonomous motivation showed an association with all dietary variables, except for diet soda. A negative association between autonomous motivation and amount of high calorie snacks can be seen, meaning that with every increase of 1 in autonomous motivation score, 3.9 less high calorie snacks are consumed. Autonomous motivation showed a positive association with the amount of fruit and water intake per day and the number of days that breakfast was consumed. For water for example, this means that with each increase of 1 in autonomous motivation score, 164 mL more water is consumed per day. Controlled motivation showed no significant associations with any of the dietary variables. For amotivation a negative association was found with the amount of days that breakfast was consumed, while positive associations were found with the portions of high calorie snacks that were consumed per week and with diet soda consumption.

Table 4. Multilevel linear regression analyses of the association between types of motivation and dietary behaviours (N=809).

	Unadjusted[a]		**Adjusted for demographic variables**[b]	
Variable	**Beta**	**95% CI**	**Beta**	**95% CI**
High caloric between meal snacks (portions/week)				
Autonomous motivation score diet	-3.8**	-6.1 - -1.5	-3.9**	-6.1 - -1.6
Controlled motivation score diet	-1.8	-4.1 - 0.4	-1.6	-3.8 - 0.7
Amotivation score diet	5.7***	3.6 - 7.9	4.5***	2.3 - 6.7
ICC level 2	0.022		0.038	
Diet soda (mL/day)				
Autonomous motivation score diet	14	-19 - -48	13	-20 - 47
Controlled motivation score diet	15	-18 – 48	15	-18 - 48
Amotivation score diet	40*	8.6 – 72	33*	0.3 - 65
ICC level 2	0.026		0.022	
Fruit (pieces/day)				
Autonomous motivation score diet	0.2***	0.1 - 0.3	0.2***	0.1 - 0.3
Controlled motivation score diet	0.0	-0.1 - 0.1	0.0	-0.1 - 0.1
Amotivation score diet	0.0	-0.1 - 0.1	0.0	-0.1 - 0.1
ICC level 2	0.021		0.022	
Breakfast (times/week)				
Autonomous motivation score diet	0.5**	0.2 - 0.8	0.5**	0.2 - 0.8
Controlled motivation score diet	-0.1	-0.4 - 0.2	-0.1	-0.4 - 0.2
Amotivation score diet	-0.3*	-0.6 - -0.1	-0.3*	-0.6 - -0.1
ICC level 2	0.082		0.071	
Water intake (mL/day)				
Autonomous motivation score diet	158***	84 - 232	164***	90 - 237
Controlled motivation score diet	55	-19 - 129	46	-28 - 120
Amotivation score diet	-72*	-142 - -1.2	-66	-138 - 5.9
ICC level 2	<0.001		0.001	

a. outcome variables were analyzed separately, motivation variables were entered simultaneously in each model. b. values were adjusted for the following confounders: gender (male/female), age, weight status (underweight, normal weight, overweight, obese) and training level (level 1&2, 3 and 4). * significant value $\alpha < 0.05$, ** significant value $\alpha < 0.01$, *** significant value $\alpha < 0.001$.

For physical activity behavior (Table 5), autonomous motivation was only positively associated with the number of minutes per week MVPA. No other significant associations with motivation were found.

Table 5. Multilevel linear regression analysis of the associations between type of motivation and physical activity (N=807[a]).

	Unadjusted[b]		Adjusted for demographic variables[c]	
Variable	**Beta**	**95% CI**	**Beta**	**95% CI**
Moderate PA (min/week)				
Autonomous motivation score PA	49	-17 – 115	56	-10 - 122
Controlled motivation score PA	-19	-91 -53	-23	-95 - 49
Amotivation score PA	-25	-95 – 45	-29	-99 - 42
ICC level 2	0.007		0.007	
Vigorous PA (min/week)				
Autonomous motivation score PA	20	-8.4 – 48	19	-9.4 - 47
Controlled motivation score PA	21	-10 – 51	22	-8.7 - 52
Amotivation score PA	-12	-42 – 18	-19	-49 - 11
ICC level 2	0.135		0.095	
MVPA (min/week)				
Autonomous motivation score PA	69	-2.6 – 140	74*	2.4 - 146
Controlled motivation score PA	8.0	-70 – 86	6.4	-72 - 84
Amotivation score PA	-40	-116 – 36	-51	-128 - 25
ICC level 2	0.027		0.014	

a. two participants were excluded from analysis due to unrealistically high minutes of PA per week. b. outcome variables were analyzed separately, motivation variables were entered simultaneously in each model. c. values were adjusted for the following confounders: gender (male/female), age, weight status (underweight, normal weight, overweight, obese) and training level (level 1&2, 3 and 4). * significant value $\alpha < 0.05$, ** significant value $\alpha < 0.01$, *** significant value $\alpha < 0.001$.

4. Discussion

The aim of this study was to investigate the association between type of SDT motivation and diet and physical activity behaviors. Motivation partly explained the dietary and physical activity behavior of vocational students. First, amotivation was associated with consuming more unhealthy products per week and consuming breakfast less often. This type of motivation is thus associated with unhealthy dietary behavior. Second, high autonomous motivation scores showed a significant correlation with consuming less unhealthy products per week and consuming more water, breakfast and fruit and conducting more MVPA. Autonomous motivation thus seems to explain most of the healthy dietary and physical activity behavior of vocational students. Third, controlled motivation did not show an association with any of the variables. It thus does not seem to explain the variation in diet and physical activity behavior of vocational students. For moderate and vigorous physical activity separately, no motivation type seems to be of influence, since no type of motivation showed a significant association. Autonomous motivation is however significantly associated with MVPA, probably due to its large correlation with vigorous physical activity. For diet soda, no significant associations were found either. The most likely explanation for this is that it was not consumed enough in this target group to find any effect.

The average overall motivation scores show that autonomous motivation scored high for both diet and physical activity behavior, while amotivation scored relatively low. This is interesting, because the vocational students generally did not make very healthy choices, as most dietary and PA guidelines were not met except for the MVPA guidelines in students 18 years and older. Socially desirable answers might have had an influence in this. They could have caused an overestimation of the autonomous motivation scores and an underestimation of the amotivation scores.

The type of VET education did not explain a large part of the variance of the variables. It was expected that type of education was an important factor of clustering in the data, because social norm is very important for emerging adults [33]. However, the ICC for water consumption is smaller than 0.001. The other ICCs for dietary behavior are larger and show that 2.1% to 8.2% of the variance in dietary variables was related to the type of VET education that participants followed. For physical activity behaviors, the ICCs explain 0.7 to 9.5% of the variation. The low intra-class correlation could be due to the fact that the group level variable that was used to adjust for clustering of the data might have been too large or too heterogeneous. Social norms may have more influence in smaller or homogeneous groups, like class level instead of type of VET education.

The associations found in this study are consistent with previous research in other age groups and educational levels. Amotivation shows a negative association with some of the dietary behaviors of vocational students. A possible explanation for this negative association is the indifferent attitude that vocational students have towards making healthy lifestyle choices. Giles and Brennan [33] found that British late adolescents (aged 18-25) are not willing to put much effort into adopting a healthy lifestyle and thus have a rather indifferent attitude to it. This seems to be the same in Dutch vocational students. If this indifferent attitude leads to amotivation, it could explain its negative effect on dietary behavior. Amotivation however also showed a significant positive effect on consumption of diet soda. A possible explanation for this is the fact that students show no awareness of calorie content in beverages. It was found that the most important factors for choosing beverages for college students (mean age 19 years) were taste and price [47]. Health thus might not be an important factor for vocational students when consuming diet soda. Autonomous motivation is described as the type of motivation that facilitates persistence and sustainability of behavior due to its high levels of autonomy, while controlled motivation does not lead to sustainable behavior [23,48,49]. This explains why autonomous motivation is important in healthy diet and physical activity behavior in vocational students. Results of other studies follow the same pattern; in early and mid-adolescents, autonomous motivation was found to be associated with increased fruit intake and increased physical activity [27-29,31] and in vocational students autonomous motivation was found to be associated with MVPA [28]. Controlled motivation apparently is not enough to maintain the healthy lifestyle behaviors investigated in this study. It often does not lead to sustainable behavior, because controlled motivation is characterized by lower levels of autonomy compared to autonomous motivation. This can lead to a relapse to old behavior, as the external factor that drove the motivation is likely to be removed at some point [50].

4.1. Limitations, strengths, and recommendations

The first limitation of this study is the use of self-administered questionnaires. This may have caused recall bias. In case of diet and physical activity questions, participants tend to be too positive about their habits [51]. In this study, recall bias could thus have led to an overestimation of the diet and physical activity behavior of the study population. Additionally, the SQUASH questionnaire is known to overestimate the physical activity that participants conduct, which could have caused an overestimation of the physical activity of vocational students [52]. The exact effect that these possible overestimations might have had on the found associations cannot be inferred. Second, the cross-sectional nature of this study is a limitation, as type of motivation and behavior were measured at the same time, their interrelationship does not necessarily reflect a causal association.

Finally, the study population consisted of vocational students from three VET school locations in the urban region of the Netherlands. This makes the results not automatically applicable for VET education in general. Female students were overrepresented in the sample. This may have caused an overestimation of the diet and physical activity behavior of the study population, because being female is related to having healthier lifestyle habits [44]. Furthermore, the sample included a large number of Lifestyle & Sports students. This type of VET education attracts many students that are interested in sports and lifestyle. Therefore, this could have caused an overestimation of the diet and physical activity behavior of the study population, especially in the amount of physical activity that vocational students engage in. The effects that the above-mentioned factors had on the associations

cannot be inferred. The external validity of this study could thus be improved by obtaining a more representative sample of vocational students.

Despite the above-mentioned limitations, this study is one of the first study to our knowledge that reports associations between type of SDT motivation and dietary and physical activity behavior of vocational students. Therefore, it provides new and much needed insights in their motivation and health behavior. Moreover, the large sample size of the study increased its reliability. Furthermore, the use of multilevel analyses strengthened the conclusions of the study, because variability due to clustering of the data was accounted for.

For future research, we recommend diving deeper into the topic of SDT and self-directed health behaviors among vocational students. More insight is needed into the three basic psychological needs, autonomy, competence and relatedness and their relationship with autonomous and amotivation, in order to develop health promoting interventions for this group. In addition to diet and physical activity behavior, more variables can be investigated to get a more complete picture of the determinants of vocational students' health behavior.

4.2. Implications

The results of this study show a strong association of autonomous motivation with dietary behavior and MVPA in vocational students. Raising the mean autonomous score for diet with one point could lead to 10-20% increases in the mean scores for healthy dietary choices and a 15% decrease in the mean number of high calorie snacks. For MVPA, an increase of 74 minutes a week can be accomplished by increasing autonomous motivation with one point. The associations implicate that autonomous motivation is a reasonable target in the development of health promoting interventions.

A review by Ng et al. [21] showed that enhancing autonomous motivation led to beneficial health outcomes. Furthermore, satisfying basic psychological needs was found to be important. To enhance autonomous motivation, autonomy-supportive interventions must focus on four SDT components. First, they must increase the sense of competence of participants. Second, these feelings of competence must be coupled with feelings of autonomy. Third, interventions must make sure to give participants a sense of security or relatedness. Lastly, extrinsic rewards must be avoided, as they stimulate controlled motivation instead of autonomous motivation [50]. One possible intervention to enhance autonomous motivation is motivational interviewing, as this is a method to adhere to behavior change with many parallels with the mentioned SDT concepts [53]. In adolescents, motivational interviewing was found to be effective in promoting several healthy behaviors [54]. In addition, the peer relations have a positive effect on autonomous motivation. In adults with weight management goals for example, it was found that autonomy support by significant others led to satisfaction of psychological needs, which is beneficial for autonomous motivation [55]. Gairns et al. [56] found that high school students showed stronger autonomous motivation for physical education class, when they felt a positive relatedness with their fellow classmates. Both motivational interviewing and enhancing positive peer relations might thus be effective in enhancing autonomous motivation among vocational students.

5. Conclusions

This present study aimed to investigate to what extent each type of SDT motivation for healthy eating and physical activity explains the dietary and physical activity behavior of vocational students. It contributes to the small body of literature that exists on the health behavior of vocational students and is one of the first to our knowledge to investigate the association of health behaviors and SDT motivation in vocational students. In general, diet and physical activity behaviors of vocational students are poor. On the one hand, autonomous motivation is associated with their healthy diet and physical activity behaviors. On the other hand, amotivation shows associations with unhealthy dietary behaviors of vocational students. Controlled motivation does not show any associations with their diet and physical activity behavior. Because of its positive association with

healthy diet and physical activity behavior, autonomous motivation seems to be a valuable target for new, autonomy-supportive interventions to improve the healthy lifestyle of vocational students.

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