

## Problem perception in Dutch university students using tobacco, alcohol and drugs

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### Abstract

*When communicating about health behaviour with students, insight is needed in perceptions students have about their (un)healthy behaviour. We aimed to investigate associations between problem perception and perceived health, academic functioning in students using tobacco, alcohol or drugs. Students who were enrolled fulltime in Medicine, Economics, Occupational Therapy, History, Psychology or Information Studies in Amsterdam, the Netherlands (n = 8258), were invited for an internet-based questionnaire about perceived health, social support, study delay, and problem perception regarding tobacco, alcohol and drug use in October 2005 (response: 44%). Students using tobacco, alcohol and drugs with and without problem perception and non-users were compared (logistic regression). Problem perception in students using tobacco, alcohol or drugs was associated with worse health outcomes.*

*Keywords: students; health behaviour; health status; problem perception; academic performance*

### 1. Introduction

Smoking tobacco, drinking alcohol and using drugs are prevalent among university students (O'Malley and Johnston 2002). Steptoe and Wardle (2001) showed that an unhealthy lifestyle was associated with diminished emotional wellbeing and a poor health status. Besides, the health effects of tobacco, alcohol or drugs may also affect academic functioning at school or university. A review on the effects of early cannabis use showed that it was a predictor of early school leaving in adolescents (Lynskey and Hall 2000).

Problems with health and with academic functioning may influence each other negatively. Health problems may keep students from studying optimally, leading to worse results. Worse results may in turn have a negative effect on existing health problems, or even initiate new ones. This reciprocal relationship may leave students with health problems in a vicious circle that puts them at risk of dropping out, even when their academic abilities are sufficient. In a previous study (Boot *et al.* 2007), we showed that perceived health complaints were associated with study delay in Dutch university students. In addition, previous research has shown that, compared with their peers with jobs, university students reported more health complaints, a lower quality of life, and a worse health status (Nauta *et al.* 1996; Stewart-Brown *et al.* 2000; Vaez *et al.* 2004).

Use of tobacco, alcohol or drugs is an indicator and perhaps a determinant of this worse health status. Perceiving this as a problem is arguably a necessary first step towards behavioural change. Without problem perception, it is difficult to persuade people that it is important to change their behaviour. This study explores the role of problem perception in relation to health status and academic outcomes in university students using tobacco, alcohol or drugs. The aim of this study was to compare the health and academic outcomes of students who use tobacco, alcohol or drugs and perceive this as a problem with those who do not. Both groups of substance users were then compared with non-users.

### 2. Method

#### 2.1. Participants and protocol

Between October 2005 and February 2006, all students who were enrolled full time in Medicine

( $n = 1548$ ), Psychology ( $n = 2381$ ), Economics ( $n = 1489$ ), Occupational Therapy ( $n = 441$ ), History ( $n = 1682$ ) or Information studies ( $n = 717$ ) at the University of Amsterdam, The Netherlands, and the *Hogeschool* of Amsterdam (a college focusing on vocational training) were invited by their programme director to complete an anonymous internet-based questionnaire. These courses were chosen to collect a heterogeneous group of participants, covering all faculties. The invitation to complete the Internet questionnaire, which included the address of the website, was sent to each student by regular mail and e-mail. Two weeks later, all students were sent a reminder by e-mail.

## 2.2. Questionnaire

The questionnaire consisted of items about the use of tobacco, alcohol and cannabis, health status, fatigue, psychological problems, support, study delay and personal characteristics. Some questions were adopted from existing questionnaires, whereas others were formulated by a team of experts based on a detailed literature review and interviews with students and others. The questionnaire had seven sections.

Three single items were used to investigate use of *tobacco, alcohol and drugs*. Each item consisted of the question: 'Do you consider your use of ... a problem?' with answering categories 'Not applicable, I do not use ...', 'No, I use ..., but I do not consider this a problem' and 'Yes, I use ... and I do consider this a problem'. Specified drugs were cannabis, XTC (MDMA), coke (cocaine), heroine, magic mushrooms, and speed (amphetamines). An open-ended question encouraged students to list other drugs they might have used.

*Health status* was investigated with four items on general perceived health. Two single item questions about general health status were adopted from the SF-36 questionnaire (general health [range: 1–5] and change in health status [range: 1–5]) (Aaronson *et al.* 1998). Two additional items were added: 'Do you feel generally comfortable with yourself?' (yes/no) and 'Are you usually healthy?' (Yes/no).

*Fatigue* was investigated using the Short Fatigue Questionnaire (SFQ). The SFQ consists of four questions (range 1–7), with a higher score indicating more fatigue (total score range: 4–28, Cronbach's  $\alpha = 0.84$ ). A total score of more than 23 indicates extreme fatigue for a student population (Alberts *et al.* 1997).

*Psychological problems* were investigated using three dichotomous items directed at cognitions and

emotions (sadness, confidence in being able to solve psychological problems, thinking about death).

*Support* was measured by contacts with professional caregivers and the wish for more social support from family and friends.

*Study delay* was investigated using two items. One focused on self-reported study delay according to the study program ('Are you behind schedule according to your study program?') and the other on self-reported study delay according to the student's own perception ('Are you behind schedule according to your own plans?').

Finally, participants were asked for some *personal data*: age, sex, whether they had a partner, hometown and current living situation.

## 2.3. Analysis

Separate analyses were conducted for users of tobacco, alcohol and drugs. First, the indicators of health and academic performance were compared between the users who perceived their behaviour as a problem and those who did not. Next, users were compared with non-users. All comparisons were performed using Students' *t*-tests and Chi-square tests.

Multivariate logistic regression analyses (Enter method) were performed to create profiles for the users with problem perception, taking the users without problem perception as a reference group. Separate profiles were calculated for users with and without problem perception, taking the non-users as a reference group. All multivariate analyses were corrected for demographic variables, course of study, and use of the other substances. Nagelkerke  $R^2$  was used as a measure for the percentage of explained variance (Field 2000). Statistical significance was set at  $P < 0.05$ . All analyses were performed using SPSS for Windows (version 12.0).

## 3. Results

### 3.1. Population

Out of 8258 students 3664 completed the questionnaire (response rate 44%). Population characteristics are presented in Table 1. Information regarding the consumption of tobacco, alcohol and drugs is listed in Table 2. From the smokers, 60% considered their smoking behaviour a problem. Within the group of students drinking alcohol, 18% considered this a problem. Twenty-seven per cent of all participants reported using drugs, and 8% of them considered their use problematic. Due to the small number of

users of heroine, GHB and LSD, students who only used these drugs were excluded from the analyses on drug use (Table 2).

In Table 3, differences in health and academic outcomes and personal characteristics between users with and without problem perception and differences between users and non-users are presented, resulting from bivariate analyses.

### 3.2. Multivariate analyses

#### Tobacco

The results from the multivariate analyses presented in Table 4 show that students who considered their smoking a problem reported worse general health status and reported to be usually less healthy than students without problem perception. Tobacco smokers with problem perception were studying psychology

**Table 1:** Population characteristics

Characteristics		<i>n</i>	%
Sex	male	1231	34
Age (years)	mean (standard deviation)	22.1	(4.3)
Living situation	alone or with partner	1438	39
	with peers	912	25
	with family	1314	36
Study course	Psychology (response: 55%)	1298	35
	Medicine (response 56%)	859	23
	Occupational therapy (response 62%)	272	7
	Economics (response 38%)	599	16
	History and Archaeology (response 32%)	538	15
	Information studies (response 14%)	98	3

**Table 2:** Use of tobacco, alcohol and drugs, with and without problem perception (PP)

Substance	Use		Use with PP		Use without PP	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Tobacco	1018	28	410	11	608	17
Alcohol	3221	88	2646	72	575	16
Drugs	977	27	829	23	73	2
Cannabis	902	25	829	23	73	2.0
XTC <sup>a</sup>	210	5.7	194	5.3	14	0.4
Cocaine	118	3.2	109	3.0	9	0.2
'Paddos' <sup>b</sup>	103	2.8	98	2.7	5	0.1
Speed <sup>c</sup>	40	1.1	39	1.1	1	0.0
Heroin	5	0.1	5	0.1	-	
LSD <sup>d</sup>	5	0.1	5	0.1	-	
GHB <sup>e</sup>	3	0.1	3	0.1	-	

Notes: <sup>a</sup> 3,4-methylenedioxy-N-methylamfetamine (MDMA); <sup>b</sup> Paddos: 'magic' mushrooms containing the substances psilocybin and psilocin; <sup>c</sup> Amphetamine; <sup>d</sup> Lysergic acid diethylamide; <sup>e</sup> gamma-hydroxybutyric acid.

**Table 3.** Bivariate associations between using tobacco, alcohol and drugs, with and without problem perception, and indicators of health and academic performance

	Tobacco		Alcohol		Drugs	
	PP+	PP-	PP+	PP-	PP+	PP-
No user	<i>n</i> = 2646	<i>n</i> = 608	<i>n</i> = 410	<i>n</i> = 443	<i>n</i> = 2646	<i>n</i> = 829
General health status						<i>n</i> = 73
General health (1:good – 5:bad)	2.0 (0.7)	2.3 (0.8)	2.0 (0.7)	2.17 (0.8)	2.1 (0.7)	2.0 (0.7)
Change in health (1:better– 5:worse)	2.9 (0.7)	2.9 (0.8)	2.8 (0.7)	2.9 (0.8)	2.9 (0.8)	2.9 (1.0)
Not comfortable with self (%)	15.9	19.7	15.1	23.5	14.1	15.9
Usually not healthy (%)	8.5	19.2	7.8	16.5	12.5	31.7
Extreme fatigue (score >23) (%)	9.0	12.5	7.8	14.9	6.3	26.8
Psychological health status						11.0
Often sad (%)	21.8	26.0	21.5	29.3	19.1	7.9
No faith to solve problems (%)	6.5	9.5	6.1	12.4	5.0	23.3
Thinking: 'I'd rather be dead' (%)	16.2	20.6	17.8	25.1	17.2	6.8
Social support						18
Desire for social support (%)	20.9	24.3	18.5	34.5	17.2	20.0
No professional help at moment (%)	80.1	80.4	82.4	76.5	84.7	81.2
Academic performance						
Perceived study delay (%)	37.3	54.9	47.3	42.4	50.6	61.0
Programme study delay (%)	44.8	62.5	56.8	44.0	62.3	57.7
Personal characteristics						
Age (years)	22.0 (4.5)	22.4 (3.6)	22.2 (4.0)	22.2 (4.5)	22.2 (3.6)	22.0 (3.7)
Male (%)	32.0	37.8	29.8	49.4	30.8	43.5
Living with peers (%)	22.4	31.9	30.7	12.4	38.3	29.3
Youth in the Netherlands (%)	94.9	93.9	94.1	91.2	96.2	94.4
Not having a partner (%)	49.2	52.8	51.2	54.8	61.0	50.7
Academic programme:						
Psychology	66.3	12.6	21.0	8.3	73.0	32.8
Medicine	73.2	11.2	10.4	74.9	14.8	1.4
Occupational Therapy	84.6	7.0	8.5	12.9	83.8	7.7
Economics	73.0	10.7	16.4	22.7	63.8	18.2
History	67.5	19.0	11.9	69.9	18.2	3.7
Information Studies	79.6	12.2	8.2	11.2	70.4	1.3
						27.6
						4.1

Notes: Bold values:  $p < 0.05$  between the users and non-users (column 'no') or between the users without (PP-) and with (PP+) problem perception.

more often than information studies. This group was also more likely to perceive any use of alcohol and drugs as a problem than the group that did not view their smoking as a problem.

Compared to the non-smokers, smokers with problem perception reported worse health, to be less healthy usually and more perceived study delay. They were more likely to live alone or with a partner. Psychology students who smoke considered this a problem more often than students of medicine or information studies. Students who smoke but did not consider it a problem were more likely to be living alone or with a partner, and study psychology compared with non-smokers.

*Alcohol*

Students who considered their use of alcohol a problem reported being less healthy usually, they did not desire more social support, and they reported more study delay (Table 5). They were more often male, without a partner, and living with peers. They studied psychology more often than information studies or occupational therapy. In addition, alcohol users with problem perception who also smoked were more likely to report problem perception regarding

their use of tobacco than those who did not view their drinking as a problem.

Compared to the non-users, students who viewed their drinking as a problem did not desire more social support, and reported more study delay. They were more often younger, male, and without a partner. In addition, they had generally grown up in the Netherlands, and were living alone or with a partner rather than with their parents. In addition to viewing smoking as a problem, this group was also more likely to view their use of drugs as a problem.

Compared to students who never drink alcohol, alcohol users without problem perception thought about death less often, and had less desire for social support. They were more often younger, having a partner, had grown up in the Netherlands, and were living alone or with a partner rather than with parents or family; they were also more likely to be psychology students than economics students.

*Drugs*

Students who use drugs and considered it a problem reported deterioration in health over the previous year more often than drug users without problem perception (Table 6). In addition, they did not believe

**Table 4:** Multivariate models for tobacco smoking and problem perception (PP), presented as odds ratios with 95% confidence intervals

Tobacco	PP	PP	No PP
	<i>R</i> <sup>2</sup> : 17%	<i>R</i> <sup>2</sup> : 26%	<i>R</i> <sup>2</sup> : 17%
<b>Reference group</b>	<b>no PP</b>	<b>no use</b>	<b>no use</b>
Worse general health	1.27 (1.02–1.59)	1.37 (1.17–1.61)	1.06 (0.88–1.28)
No change in health	0.79 (0.59–1.05)	0.99 (0.80–1.22)	1.15 (0.90–1.46)
Comfortable with self	1.15 (0.74–1.78)	1.28 (0.93–1.75)	1.02 (0.71–1.48)
Usually healthy	0.50 (0.31–0.83)	0.54 (0.39–0.75)	1.09 (0.68–1.74)
No extreme fatigue	0.86 (0.51–1.42)	0.88 (0.62–1.25)	1.06 (0.68–1.67)
Often sad	1.00 (0.68–1.47)	1.00 (0.75–1.32)	0.97 (0.71–1.34)
No faith to solve psych. problems	1.10 (0.61–2.00)	1.04 (0.68–1.58)	0.92 (0.54–1.57)
Thinking ‘I’d rather be dead’	0.92 (0.62–1.38)	1.07 (0.80–1.43)	1.14 (0.83–1.58)
Wish for social support	1.15 (0.80–1.64)	1.05 (0.82–1.35)	0.84 (0.62–1.12)
No professional help	0.51 (0.13–1.96)	1.08 (0.49–2.36)	1.75 (0.50–6.10)
Yes, 1-2 professionals	0.49 (0.12–1.94)	0.82 (0.37–1.82)	1.48 (0.42–5.26)
Yes, >2 professionals	ref	ref	ref
Program study delay	1.03 (0.74–1.45)	1.18 (0.92–1.50)	1.26 (0.96–1.66)
Perceived study delay	1.18 (0.85–1.63)	1.43 (1.13–1.82)	1.21 (0.93–1.59)

Notes: Significant Odds Ratios are in bold (*P*<0.05). These models are corrected for personal characteristics, study course, and the use of alcohol and drugs

they would be able to solve their psychological problems alone and wanted more social support. They were more likely to be in contact with more than two professional helpers and more likely to be male. Students who viewed their use of drugs as a problem were significantly more likely to view their use of tobacco as problematic.

Students using drugs with problem perception reported a change in health status over the past year more often than non-users and did not believe they would be able to solve their psychological problems. In addition, they were more likely to want more social support and were more often in contact with more than two professional helpers. Compared to students who do not use drugs, using drugs with problem perception is significantly associated with using tobacco and alcohol with problem perception.

Compared to non-users, students who use drugs without problem perception were more frequently younger, male, living alone or with a partner rather than with their parents, and they were most likely to study psychology. Drug use without problem perception was associated with problematic use of alcohol, compared with the non-users.

#### 4. Discussion

The main finding of this study was that problem perception regarding the use of tobacco, alcohol or drugs was associated with worse perceived health. In the case of alcohol, problem perception was associated with study delay as well.

##### 4.1. Tobacco use

Smoking tobacco with problem perception was associated with perceived worse health compared to smokers without problem perception. The higher negative health perception of this group accounts for most of the differences in perceived health between smokers and non-smokers. Smokers without problem perception did not report worse health than non-smokers. Although we cannot distinguish cause and consequence due to the cross-sectional nature of this study, it can be hypothesized that the perception of health problems may contribute to problem perception. This hypothesis is in line with results from a previous study of college students (Prokhorov *et al.* 2003), which claimed that smokers who reported

**Table 5:** Multivariate models for drinking alcohol and problem perception (PP), presented as odds ratios with 95% confidence intervals

Alcohol	PP	PP	No PP
	$R^2$ : 21%	$R^2$ : 59%	$R^2$ : 19%
Reference group	no PP	no use	no use
Worse general health	0.99 (0.84–1.16)	0.92 (0.73–1.15)	0.94 (0.79–1.12)
No change in health	0.86 (0.70–1.06)	0.97 (0.72–1.30)	1.12 (0.89–1.41)
Comfortable with self	1.13 (0.80–1.60)	1.22 (0.78–1.91)	1.12 (0.80–1.57)
Usually healthy	0.69 (0.48–0.99)	0.99 (0.61–1.62)	1.42 (0.97–2.08)
No extreme fatigue	1.39 (0.91–2.14)	1.53 (0.90–2.59)	1.08 (0.75–1.57)
Often sad	0.81 (0.60–1.09)	0.81 (0.55–1.21)	0.99 (0.73–1.33)
No faith to solve psych. problems	0.61 (0.37–1.02)	0.55 (0.29–1.02)	0.84 (0.55–1.29)
Thinking 'I'd rather be dead'	1.24 (0.93–1.67)	0.76 (0.46–1.24)	0.73 (0.54–0.98)
Wish for social support	0.75 (0.57–0.98)	0.45 (0.32–0.64)	0.62 (0.48–0.80)
No professional help	0.95 (0.41–2.18)	1.63 (0.58–4.59)	1.72 (0.79–3.75)
Yes, 1-2 professionals	0.69 (0.29–1.63)	1.24 (0.43–3.59)	1.77 (0.80–3.92)
Yes, >2 professionals	ref	ref	ref
Program study delay	1.45 (1.14–1.85)	1.63 (1.14–2.31)	1.14 (0.86–1.51)
Perceived study delay	1.06 (0.84–1.35)	0.87 (0.61–1.23)	0.81 (0.61–1.08)

Notes: Significant Odds Ratios are in bold ( $P < 0.05$ ). These models are corrected for personal characteristics, study course, and the use of tobacco and drugs

respiratory symptoms showed an increased readiness to change their behaviour.

With smoking, there is a long incubation time before serious consequences appear (Skurnik and Shoefeld 1998; Hampl and Betts 1999; Bartal 2001) and students tend to be optimistic regarding the consequences of smoking (Prokhorov *et al.* 2003). This may explain the lack of association between smoking and health in the group without problem perception. Another explanation may be the quantity of tobacco use. Students with problem perception may be smoking more than those without problem perception. Of course, all levels of smoking should be discouraged. The present results suggest that students only start thinking about their smoking behaviour when they perceive health complaints.

#### 4.2. Alcohol use

Problem perception in students who drink alcohol was associated with worse health. It is also possible that these perceived health problems may have initiated the perception that alcohol use is a problem. When we look at the wide use of alcohol in our society and its acceptance, which is quite different from the

attitude towards tobacco and drugs, the group of students who do not drink alcohol can be considered a special group.

The group of non-users consisted mainly of women who had spent their youth outside the Netherlands. It is possible that this group does not drink for cultural or religious reasons (many of this group could be Islamic). Intercultural differences can also lead to problems with peers who have a different culture or religion (or no religion at all). It has been reported that cultural differences or immigrant background may lead to psychological problems (Oppedal and Roysamb 2004; Kennard *et al.* 2006). This may explain our finding that students who did not drink alcohol reported psychological problems more often than other groups. Students who spent their youth abroad, and especially if they had lived in several different countries, may be accustomed to superficial relationships, which might explain their wish for more social support.

#### 4.3. Drugs

Students who perceived their use of drugs as a problem reported worse health than users without problem perception. They were also more likely to be

**Table 6:** Multivariate models for using drugs and problem perception (PP), presented as odds ratios with 95% confidence intervals

Drugs	PP <i>R</i> <sup>2</sup> : 26%	No PP <i>R</i> <sup>2</sup> : 34%	No PP <i>R</i> <sup>2</sup> : 22%
Reference group	<b>no PP</b>	<b>no use</b>	<b>no use</b>
Worse general health	0.98 (0.66–1.46)	1.01 (0.70–1.45)	0.91 (0.79–1.05)
No change in health	0.54 (0.31–0.93)	0.46 (0.27–0.77)	0.93 (0.78–1.11)
Comfortable with self	1.27 (0.59–2.77)	0.99 (0.49–2.00)	0.90 (0.69–1.19)
Usually healthy	0.74 (0.36–1.53)	0.74 (0.37–1.46)	0.81 (0.59–1.11)
No extreme fatigue	0.92 (0.37–2.28)	0.96 (0.43–2.15)	1.10 (0.79–1.53)
Often sad	1.29 (0.65–2.56)	1.45 (0.77–2.73)	1.11 (0.87–1.41)
No faith to solve psych. problems	2.61 (1.13–6.04)	2.28 (1.06–4.89)	1.08 (0.74–1.60)
Thinking ‘I’d rather be dead’	1.39 (0.72–2.69)	1.20 (0.61–2.34)	1.19 (0.93–1.53)
Wish for social support	1.85 (1.03–3.30)	1.73 (1.00–2.99)	1.00 (0.80–1.25)
No professional help	0.08 (0.02–0.36)	0.27 (0.09–0.82)	2.07 (0.82–5.24)
Yes, 1-2 professionals	0.09 (0.02–0.40)	0.28 (0.08–0.92)	2.26 (0.88–5.78)
Yes, >2 professionals	ref	ref	ref
Programme study delay	1.15 (0.60–2.20)	1.25 (0.68–2.32)	1.13 (0.92–1.38)
Perceived study delay	1.28 (0.69–2.36)	1.36 (0.76–2.43)	1.10 (0.90–1.35)

Notes: Significant Odds Ratios are in bold (*P*<0.05). These models were corrected for personal characteristics, study course, and the use of tobacco and alcohol.

in contact with more than two professional helpers. Using drugs may have a large impact on daily functioning. It is known that drug users may undergo behavioural or personality change, particularly in case of addiction, and may end up socially isolated. This may explain the wish for more social support expressed by drug users with problem perception. However, using drugs was not associated with study delay. On the other hand, a longitudinal study of adolescents showed that persistent perceived academic failure appeared to be a predictor of more than weekly alcohol, tobacco and marijuana use (Bergen *et al.* 2005). However, these effects were all fully mediated by antisocial group behaviour. This is in line with previous studies of university students (Lynskey and Hall 2000; Fergusson *et al.* 2003), which found that it is not the use of drugs such as cannabis, but rather the social context within which the drugs are used that explains the associations between drug use and academic performance.

#### **4.4. Problem perception**

This study focused on problem perception regarding substance use, asking participants if they considered their use of diverse substances as problematic. A recent study on substance abuse among medically ill adults (O'Toole *et al.* 2006) concluded that illness encourages users to seek treatment.

Similarly, the present results suggest that problem perception is triggered by health complaints. This finding can help providers develop interventions. At present, it would appear that students only perceive their own behaviour as a problem once they have concerns about their health. If problem perception is a necessary first step towards behavioural change, users with problem perception should be more eager to change their behaviour. In addition, users without problem perception may continue their behaviour, which could lead to health complaints in the future, which might then initiate problem perception. From the point of view of prevention, this cycle needs to be stopped, which means that students need to be encouraged to change their unhealthy behaviour before they develop health concerns.

#### **4.5. Limitations of the study**

The response to the questionnaire was 44%, which implies that the present results should be interpreted with care. Considering the topic area, it is possible that students with health complaints or study problems would be more eager to complete the questionnaire than students without such problems. The

present findings may overestimate the actual extent of study and health problems. On the other hand, the findings may underestimate actual levels of substance use due to under-reporting.

Our data are all based on self-reported information. This approach was chosen to ensure the participants' anonymity. By focusing on problem perception rather than quantity or frequency of substance use, we were hoping to encourage respondents to answer the questions about substance use honestly. Consequently, we do not have information on the amount of tobacco, alcohol or drugs that students used. Thus, we cannot assess whether the students who do not consider their substance use a problem, are only using minor amounts, or whether they are unaware of their own health risk behaviour.

The data would become more valuable if the questionnaire were repeated over time. Longitudinal designs can reveal information about causes and consequences, which cannot be distinguished in cross-sectional surveys. When interpreting the results, it should also be kept in mind that university systems vary widely between countries, as does legislation regarding the use of drugs.

#### **4.6. Implications for research and practice**

The concept of problem perception needs further study. It would be interesting to investigate whether problem perception is a sudden process or whether it develops gradually; similarly, it would be interesting to know whether some subcategories of students perceive situations as problematic more quickly than others. If the process of problem perception consists of different stages, the determinants of problem perception in university students using tobacco, alcohol or drugs are worth investigating. Research on the Transtheoretical Model of Change (Prochaska 1994; Prochaska *et al.* 1994) has shown that decisional balance and self-efficacy determine the transition from one stage to another. Decisional balance refers to the relative weight an individual applies to the pros and cons of certain behaviour. However, determinants within a population of university students have not been investigated so far. The present study shows that perceived health status may play a role, but to promote prevention, it is important to persuade students to change their behaviour before they experience negative health or academic effects.

Prevention programmes to increase health behaviour should address both students with and without problem perception. In the present study, students with problem perception reported more health



problems, but those without problem perception also reported health and academic problems.

Even though our study is based on a student population, the results may have implications for the general population as well. Problem perception deserves extra attention in health education programmes. When communicating information about health promotion, problem perception is an important factor that should be taken into account. Previous research (Van der Sanden and Meijman 2008) has discussed the importance of distinguishing between (public) awareness, understanding, engagement, and participation regarding health issues. Problem perception may help individuals make the crucial step from awareness to understanding. It is possible that low levels of awareness in the target population make prevention difficult, since the starting points for knowledge exchange are absent.

#### 4.7. Conclusions

Problem perception among university students who use tobacco, alcohol or drugs was associated with perceived negative health outcomes compared to student users without problem perception. Students who do not use alcohol appear to represent a distinct group. When developing intervention or prevention programmes, problem perception deserves attention.

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