

Behavioral and psychosocial influences of risk perception among Hungarian adolescents

Bettina F. Piko¹, Frederick X. Gibbons²

¹ Department of Psychiatry, Division of Behavioral Sciences, University of Szeged, Hungary

² Iowa State University, Department of Psychology, Ames, IA, USA

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Summary

Objective: The main goal of the present study was to assess adolescents' risk perception, namely, their estimates of the likelihood of smoking and alcohol-related illnesses and accidents.

Methods: The survey was conducted among high school students in Szeged (N = 560, aged between 14–19 years; mean: 16.7; S.D.: 1.4 years). The self-administered questionnaire contained items on sociodemographics, risk perception, health risk behaviors, and certain psychosocial variables.

Results: Being a male was associated with risk perception only in terms of alcohol-related illnesses. Smokers, alcohol users, and those who engaged in reckless transportation, evaluated themselves as being at higher risk for substance related illnesses and accidents compared to those who did not report such behaviors. Those who tended to use a seat belt, however, estimated the same amount of risk for an accident as did those who tended not to use them. Social attitudes tended to positively, whereas personal attitudes tended to negatively influence perceptions of health risks. The role of social comparison and self-efficacy, however, depends on the nature of behavior.

Conclusion: Besides behavioral influences, psychosocial variables also play a role in adolescents' risk perception.

Key words: Adolescence – Risk perception – Smoking – Alcohol – Transportation behavior – Psychosocial influences.

Risk perceptions, that is, beliefs about the likelihood of an unpleasant event, such as illness or accident, are a key factor in public health.¹ Despite the fact that information on health risks is widely available for the public, the occurrence of

health risk behaviors, such as smoking and drinking, is still very high.² Studies reveal that this may be attributable more to attitudinal influences of health risk behaviors than to a lack of knowledge of their harmful effects.³ Many people are either not really aware of the addictive nature of substance use, or if they do know about its harmful effects, they do not feel personally at risk. In order to make health decisions, individuals need to understand the risks and benefits as well as the limits of their own knowledge and belief system.^{4,5}

An individual's risk perception influences his or her behavioral decisions.⁶ On the other hand, this link is rather bidirectional; not only risk perception as an attitude influences behavior but usually there is a close connection between prior behavioral experiences and perceived personal risk. For example, those who drink, usually evaluate themselves at higher risk for alcohol-related problems than those who do not.^{7,8} Despite these experiences, however, risk perception is not always accurate.⁹ Unrealistic optimism is a frequently described bias in risk perception.¹⁰ It is based on an egocentric belief that serves to conceal the link between a risky behavior (e. g., smoking) and the acknowledgement of its harms. An individual may resolve this discrepancy in two ways: he/she may stop the behavior, or deny his/her personal risk and continue the behavior.

The tendency to take risks among adolescents may be attributable to novelty and sensation-seeking, which increase dramatically during puberty.¹¹ Also, those engage in smoking or drinking are well aware of the "benefits" related to these behaviors, and this may lead to an intention to continue smoking or drinking.^{12,13} Some have suggested that health risk behaviors are particularly common among adolescents because of their "feelings of invulnerability".^{14,15} This invulnerability may lead to a fatalistic belief that an outbreak of an accident is outside our control which may lead to the lack of seatbelt use.¹⁶ The perceived invulnerability may avoid them thinking

about future consequences even if they are aware of the negative health outcomes.¹⁷

However, research results show a more sophisticated picture. Studies of comparisons of risk perception between adults and adolescents have found that teenagers are actually less optimistic about avoiding injury and substance-related illness, especially if they actually are at greater risk for such events.^{18, 19} Although adolescents often demonstrate that they are capable of effective decision-making regarding health risk behaviors, their lack of life experience and knowledge could lead to errors in these judgements.²⁰ Another study has revealed that adolescents' perceptions of risk are related to their actual health risk behaviors and these behavioral experiences seem to be more important than the role of gender or other sociodemographics. However, they tend to judge themselves to be at less than average risk for their age and gender for a number of unpleasant events (such as injury or illness).⁹ Therefore, there is a need for further research to better understand adolescents' risk perceptions and to identify background variables related to the perceptions including sociodemographics and psychosocial factors.

Whereas we know much about the role of risk perception in predicting health risk behaviors, studying behavioral and psychosocial influences of risk perception is a less common research topic. Psychosocial factors play an important role in adolescent health behaviors. We anticipate that they may be important determinants of risk perception as well. Among psychosocial factors, some attitudes reflect social orientations, such as social comparison and competitiveness. Social comparison may influence youth's health behaviors through comparing one's behavior to others.²¹ Moreover, social comparison influences not only behavior but it may also affect adolescents' risk perception.²² This is because risk perceptions are associated with norms and beliefs about one's social network.²³ A previous study found a strong relationship between risk perception, social attitudes, and substance use.²⁴ Whereas social comparison tendencies represent a social orientation in terms of adjustment to similar others, hostility is often defined as a rather stable attitude of negative evaluation of people and events. Not surprisingly, hostility plays an important role in smoking and as a consequence, it may contribute to the development of coronary heart disease, as a risk factor.²⁵

Personal attitudes, such as satisfaction with life or future-orientation, are also likely to be associated with risk perceptions.²⁶ Previous studies have found that future-oriented students and those who are satisfied with their life tend to avoid health risk behaviors²⁷; they may also have lower (i. e. more optimistic) perceptions of risk as well. Personal agency, for example, self-efficacy, may also have an influence not only on behavioral decisions^{28, 29}, but also on the process of risk perception.

The main goal of the present study was to examine factors thought to influence adolescents' risk perceptions, regarding three health behaviors: smoking, drinking, and transportation behavior (reckless transportation and seatbelt use). We examined sociodemographics: age, gender, parental socioeconomic background and behavior: health behavior and psychosocial influences: self-efficacy, satisfaction with life, future-orientation, social comparison and hostility. Based on the literature, we anticipate that behavioral experiences may have a strong influence on risk perceptions, that is, perceived risk of smoking or alcohol-related illnesses and accidents. We also anticipate possible gender differences in risk perceptions depending on differences in behavioral experiences. Moreover, we anticipate that psychosocial variables may contribute to the development of risk perception. For example, we anticipate that social attitudes may enhance risk perception, whereas personal attitudes may lower its levels.

Methods

The data were collected during the fall semesters of 2001. The sample comprised 560 students (age range between 14–19; mean: 16.7; S.D.: 1.4 years; 57% males) from 4 public high schools in Szeged (a major metropolitan center in the south-eastern region of Hungary). Schools were chosen randomly from a list of high schools in Szeged; classes were chosen randomly into the sample. Altogether, 600 questionnaires were sent out, the response rate was 93.3%. Those who did not participate in the study consisted primarily of youth who were absent in due time. Self-administered questionnaires were used as the method of data collection. Parents were informed of the study, and their consent was obtained prior to data collection. A standardized procedure of administration was followed. Trained graduate students distributed the questionnaires to students in each class, after briefly explaining the study objectives and giving the necessary instructions. Participation was voluntary. Students completed the questionnaires during the class period. The teacher was also present in the classroom when data were collected, however, did not interfere with the process. The questionnaires, which were anonymous, contained items on risk perception, health behaviors, sociodemographics, and psychosocial influences.

Sociodemographics

Besides age and gender, father and mother schooling and SES self-assessment were asked. A four-level classification of education was used to measure father and mother schooling: 1) primary education; 2) apprenticeship; 3) General Certificate of Education, i. e. high school level; and 4) University or

college degree. In addition, an evaluation of socioeconomic status (SES) was used. The SES indicator asked adolescents to respond to the following question: "How would you rate your family's socioeconomic status?" The answer categories included: 1) lower; 2) lower-middle; 3) middle; 4) upper-middle; and 5) upper class.³⁰

Health behaviors

The instruments contained questions assessing the extent to which participants had engaged in four health behaviors during the last three months.^{27, 31} Smoking and drinking were measured by the following question: "How many times in the last three months did you smoke cigarettes/had a drink of alcohol?" Responses regarding smoking were rated as "not at all" (1), "a few times every month" (2), "several times a week" (3), "regularly, 1 to 2 a day" (4), "regularly, 3 to 10 a day" (5), "regularly, 11–20 a day" (6), and "regularly, more than 20 a day" (7). Drinking was measured by a 5-item scale that ranged from never (1) to regularly, three or more times a week (5). Reckless transportation was measured by the following question: "How many times in the last three months did you drive or behave recklessly (e.g. as a passenger) in any form of transportation (a car, bicycle, etc.)?" The 5-item scale included responses that ranged from never (1), to regularly, about every week (5). Finally, seatbelt use was measured by the following question: "When you drove or rode a car in the last three months, how often did you wear a seatbelt?" Response categories for seatbelt use varied from never (1) to always (5).

Risk perception

Risk perception was measured in two ways. First, respondents were asked: "How likely is it that you will have a smoking-related illness (such as lung cancer) in the future?" A similar question was asked in terms of alcohol-related problems and accidents. Responses were provided on 7-point scales, ranging from 1 (no chance) to 7 (definitely will). In addition to this absolute risk estimate, respondents were also asked to compare their risk perception with others of their age: "Compared with others of your age, how likely is it that you will have a smoking-related illness (such as lung cancer) in the future?", etc. These were also followed by 7-point scales, ranging from 1 (much less likely) to 7 (much more likely).^{17, 32}

Psychosocial variables

Satisfaction with life was measured by The Life Satisfaction Scale³³, which consists of five statements, such as "In most ways my life is close to ideal." Participants indicated how strongly they agreed with each item from 1 („strongly disagree”) to 7 („strongly agree”). The final scale had a range of

5–35 with a Cronbach's alpha value of 0.80. This scale and the following ones were translated from English into Hungarian and back-translated by bilingual translators.

Future-orientedness was measured by a shortened version (6 items) of The Consideration of Future Consequences scale.³⁴ The scale consists of four statements, such as: "I often engage in a particular behavior in order to achieve outcomes that may not result for many years". The responses were rated from 1 to 5. The final results were coded from 6 to 30. Cronbach's alpha coefficient was 0.61.

Hostility was assessed with the 8-item subscale of The Aggression Questionnaire.³⁵ The scale consists of negative or cynical evaluations of others and life in general, e.g., "When people are especially nice, I wonder what they want." The responses were rated with a 5-point scale from 1 ("extremely uncharacteristic") to 5 ("extremely characteristic"). The final scale was coded from 8–40, with a Cronbach's alpha of 0.75. The Iowa Netherlands Comparison Orientation Measure (INCOM) was used to measure social comparison tendencies.²¹ The scale includes 11 items (e.g., "I always pay a lot of attention to how I do things compared with how others do things"); the scores ranged from 11 to 55 (using a 5-point responses scale). The reliability coefficient was 0.68.

The General Self-efficacy Scale measured perceived self-efficacy.³⁶ The scale consist of 10 items and evaluates a general sense of self-efficacy that refers to global confidence in one's coping abilities in demanding situations (e.g., "I can always manage to solve difficult problems, I try hard enough"). Responses range from 1 to 4 points. The reliability coefficient was 0.81.

SPSS for MS Windows Release 11.0 programme was used in the calculations, with maximum significance level set to .05. Differences according to gender and health behavior status were calculated by t-tests. The role of psychosocial variables in influencing risk perceptions were assessed by models of multiple regression analysis. Model 1 employed sociodemographics, whereas in Model 2, effects of behavioral and psychosocial variables were also added.

Results

Table 1 presents occurrence of health behaviors. Health behavior data of the sample were similar to previous data from Szeged studies and those from national representative statistics.³⁷ The 3-month prevalence of smoking was 58.7% in the sample; 12.2% of them reported occasional smoking. The 3-month prevalence of drinking was 75.4%; 13.8% drank on a weekly basis. Reckless transportation was reportedly 56,4% of them with different frequencies. Seatbelt use (always) was

Table 1 Prevalence of health behaviors in the sample (%)

3-month prevalence of health behaviors	Total (N = 560)	Boys (N = 319)	Girls (N = 241)
<i>Smoking***</i>			
Not at all	41.3	38.4	45.2
1–2/month	12.2	11.0	13.7
1–2/week	3.2	2.8	3.7
1–2/day	6.3	5.7	7.1
3–10/day	20.0	18.2	22.4
11–20/day	13.2	17.9	7.1
>20/day	3.8	6.0	0.8
<i>Alcohol use***</i>			
Not at all	24.6	21.6	28.6
Once or twice	38.0	33.9	43.6
2 or 3 times/month	23.6	25.1	21.6
Once or twice/week	9.3	11.9	5.8
3 or more times/week	4.5	7.5	0.4
<i>Reckless transportation</i>			
Never	43.6	40.1	48.3
Once or twice	36.3	36.7	35.8
A few times	13.4	15.0	11.3
Often	3.6	4.1	2.9
Regularly	3.0	4.1	1.7
<i>Seatbelt use</i>			
Never	27.8	28.2	27.1
Occasionally	29.4	29.5	29.2
Half of the times	6.6	8.2	4.6
Most times	17.4	18.8	15.4
Always	18.8	15.4	23.8

Note: Gender differences by chi-square tests: *** $p < .001$

reported by 18.8 % them, 17.4 % most times, whereas 27.8 % never. Gender differences by Chi-square tests were found in terms of smoking ($\chi^2 = 26.237$, d. f. = 6, $p < 0.001$) and alcohol use ($\chi^2 = 27.895$, d. f. = 4, $p < 0.001$): boys reported higher frequencies.

Comparing means of different risk perceptions, adolescents evaluated accidents as the event most likely to occur among the unpleasant events. This was followed by smoking-related illness, which seems quite realistic based on their high occurrence of smoking. Comparing means of absolute and relative risk perceptions, differences between absolute and relative risk perception were not significant; therefore, only values of absolute risk perception are applied in subsequent analyses. Results for risk perception by gender can be seen in Table 2. Using Student's t-tests, accident was assessed by both males and females as being of high likelihood. In terms of the perception of smoking and drinking-related health problems, boys reported higher likelihood.

Table 3 presents risk perception by health behavior status. In this case, variables of health behaviors were dichotomized based on the frequencies during the past three months: never/ever (e.g., smoker versus nonsmoker). As Student's t-tests reveal, those who report reckless transportation also assess accident more likely to happen in the future. Likewise, smok-

Health risk perceptions	Boys (n = 319)		Girls (n = 241)		Significance
	Mean	S.D.	Mean	S.D.	
Accident	2.9	1.6	2.9	1.5	$p = 0.100$
Alcohol-related illness	2.1	1.5	1.6	1.1	$p = 0.000$
Smoking-related illness	2.3	1.5	2.0	1.4	$p = 0.026$

Table 2 Risk perception by gender

Note: Student's t-tests.

Health risk perceptions	Reckless at transportation		Not reckless at transportation		Significance
	Mean	S.D.	Mean	S.D.	
Accident	3.2	1.6	2.6	1.5	$p = 0.000$
Accident	Seatbelt user		Seatbelt nonuser		$p = 0.422$
	2.9	1.5	3.0	2.5	
Alcohol-related illness	Alcohol user		Alcohol nonuser		$p = 0.000$
	2.1	1.5	1.4	1.0	
Smoking-related illness	Smoker		Nonsmoker		$p = 0.000$
	2.7	1.5	1.4	1.0	

Table 3 Risk perception by health behavior status

Note: Student's t-tests. Dichotomization is based on the health behavior status during the past three months (never/ever).

ers' estimates of smoking-related illness are much higher and similar association can be found in relation to drinking. On the other hand, there are no differences in estimating the likelihood of an accident by seatbelt user status. That is, seatbelt use is more viewed as a preventive resource of accident-related health problems than the accident itself.

Table 4 shows descriptive statistics and bivariate correlations for psychosocial variables and health behaviors. Smoking and drinking negatively correlated with life satisfaction and future-orientation. Reckless transportation negatively correlated with self-efficacy, satisfaction with life and future-orientation, and positively with hostility. Among these psychosocial influences, seatbelt use positively correlated with future-orientation.

Table 5 presents the results for multiple regression analysis in which risk perception variables are the dependent vari-

ables. In model 1, sociodemographics are included. In model 2, behavioral and psychosocial variables are added. First, results for accidents can be seen. Among sociodemographics, none of them contributed to the prediction of risk perception. Among psychosocial variables, social comparison and self-efficacy contributed positively to perceptions of the likelihood of having an accident. Satisfaction with life and future-orientation were negative predictors. Again, those who report reckless transportation also assess an accident more likely to happen in the future. Seatbelt user status did not play a role. All the predictors included in the models explained only 10% of the variance, which may indicate an external control of this event.

Similar to the previous analysis, the next two columns show the results for drinking-related problems. In relation with sociodemographics, girls and older students assess a lower

Table 4 Descriptive statistics and bivariate correlations for psychosocial variables

Psychosocial variables	Mean (S.D.)	Smoking	Drinking	Reckless transportation	Seatbelt use
Self-efficacy	28.0 (4.4)	0.03	0.05	-0.12**	0.07
Satisfaction with life	21.5 (6.4)	-0.15***	-0.12**	-0.12**	0.05
Hostility	21.9 (6.0)	0.06	-0.01	0.11*	-0.04
Social comparison	33.2 (6.2)	-0.03	0.05	-0.03	0.10
Future-orientation	18.1 (3.2)	-0.08*	-0.07*	-0.08*	0.12**

Note. Correlation coefficients: *p<.05; **p<.01; ***p<.001

Table 5 Risk perception of accident, alcohol and smoking-related illness: multiple regression estimates including sociodemographics, behavioral and psychosocial (attitudinal) factors

	Accident		Alcohol-related illness		Smoking-related illness	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
<i>Sociodemographics</i>						
Gender	-0.01	-0.01	-0.17***	-0.13**	-0.11*	-0.05
Age	-0.03	-0.03	-0.09**	-0.11**	0.12**	0.03
Father schooling	0.01	0.01	0.01	0.02	-0.02	0.03
Mother schooling	-0.01	-0.03	-0.04	-0.02	0.03	0.03
Socioeconomic status	0.07	0.05	0.01	0.03	0.04	0.01
<i>Behavioral factors</i>						
Health behavior		0.23***(reckless transportation) -0.07 (seatbelt use)		0.35*** (alcohol use)		0.57*** (smoking)
<i>Psychosocial factors</i>						
Self-efficacy		0.11*	-	-0.13**	-	-0.09*
Satisfaction with life		-0.09*		-0.01		0.01
Hostility		0.05		0.15***		0.11**
Social comparison		0.14**		0.03		-0.08*
Future-orientation		-0.08*		-0.07*		-0.08*
Constant	3.037**	1.325	3.837***	4.087***	0.106	0.469
R- square	0.01	0.10**	0.04**	0.21***	0.03**	0.37***

*p <.05 ;**p <.01; ***p <.001; one-tailed test

Note. Multiple linear regression analyses, all predictors are entered together. Standardized regression coefficients are displayed. Changes in the R-square is based on the hierarchical F-test.

likelihood of drinking-related problems. Among psychosocial variables, hostility was a positive predictor, whereas future-orientation and self-efficacy were negatively related. Drinking predicts risk perception of drinking-related health problems. The predictors included in the models explained 21 % of the variance.

Finally, the next analyses present multiple regression models for the risk perception of smoking-related illness. Although gender and age were significant contributors in the baseline model, they did not remain significant in the final model. Similar to the accident and drinking-related problems, hostility contributed to an estimate of higher likelihood. On the other hand, social comparison lowered this likelihood. Self-efficacy and future-orientation were also significantly and negatively related. Smoking is a much stronger predictor ($\beta = 0.57$) of risk perception as compared to other health risk behaviors. This indicates a strong acknowledgement of the link between smoking and smoking-related illness, as compared to drinking and reckless transportation or seatbelt use. All the predictors included in the models explained 37 % of the variance.

Discussion

Risk perception is an important issue in public health^{1,2}, and so tracking the population's risk perceptions may be useful in preventing and modifying health risk behavior.^{6,7} Adolescents' risk perceptions may differ from adults in which psychosocial characteristics, such as novelty-seeking or a feeling of invulnerability may play a role.^{12, 18, 19} The literature suggests that certain psychosocial variables may contribute to processes of risk perception during adolescence, such as social comparison²², hostility²⁵, future-orientation²⁶, satisfaction with life²⁷, and self-efficacy.^{28, 29} We know much about the role of risk perception in predicting health risk behaviors, however, we know less about the role of factors influencing judgement of vulnerability. Therefore, we aimed at detecting adolescents' risk perceptions regarding four health-relevant behaviors: smoking, drinking, reckless transportation and seatbelt use, and possible influences, such as sociodemographics, as well as behavioral and psychosocial variables.

There were no differences in adolescents' absolute and relative risk perceptions. A study of adolescents argue that they tend to judge themselves to be at less than average risk for their age and gender for unpleasant events (such as injury or illness).⁹ Our findings do not support this. However, our results also suggest that adolescents have a basis of reality about the relative likelihood of health consequences of their behavior and do not exhibit invulnerability similar to this study.⁹

In relation to sociodemographics, boys tended to use more alcohol and cigarettes and not surprisingly, they reported a higher likelihood of experiencing smoking and alcohol-related problems in the future. This was particularly true for perceptions of alcohol-related problems: in multiple regression models, gender remained a significant variable. Gender differences in health behaviors were detected in smoking and drinking, whereas there were no differences in frequencies of reckless transportation and seatbelt use. In addition, alcohol use is closely connected to gender stereotypes³⁸, more than other health risk behaviors, for example, smoking, which is more and more accepted among adolescent girls.

Among behavioral variables, the role of behavioral experiences also play an important role similar to previous studies.^{7, 13} Those who reported higher frequencies of smoking, drinking and reckless transportation also estimated higher likelihood of an unpleasant event related to these behaviors. Seatbelt use was an exception; the risk perception was nearly the same regardless of whether the respondent used a seatbelt or not. Those who reported not wearing a seatbelt might think that an accident would be outside their control.¹⁶ On the other hand, those who reported wearing a seatbelt might also count on experiencing an accident and tended to use a seatbelt to avoid serious accident-related health problems. Therefore, higher risk perception may act as a motivation to a preventive behavior to avoid more serious problems.

Among psychosocial variables, there were differences in the role of social and personal attitudes. Overall, social attitudes tended to positively, whereas personal attitudes tended to negatively influence perceptions of health risks. This particularly true in case of hostility. Hostility may elevate levels of risk perceptions of certain unpleasant health events, such as smoking and drinking-related illnesses. Those who scored higher on the hostility scale also reported a higher likelihood of these unpleasant health problems. Previously, hostility was found to be related to substance use and accident.³⁹ In our study, hostility was not a predictor of the risk of an accident, although bivariate correlation was positive between hostility and reckless transportation.

Previous studies have indicated that future-oriented students and those who are satisfied with their life show higher level of health consciousness.^{27, 29, 31} In addition, in our study, future-orientation contributed negatively to the risk perception of an accident as well as alcohol and smoking-related health problems. Those who were future-oriented and satisfied with their life tended to count on less risks. This may stem from their higher level of health consciousness. For example, future-orientation was found to be related to the lack of smoking in a previous study.²⁷ In the present study, reckless transportation correlated negatively with future-orientation.

The role of social comparison and self-efficacy, however, depends on the nature of behaviors. Whereas social comparison was a positive influence for accident, it had a negative influence on risk perceptions of smoking-related illness. This means that social comparison may lower the level of perception of smoking-related risks, perhaps because it encourages smoking behavior from the social network generating a feeling of invulnerability.¹² On the other hand, social comparison may contribute to a higher awareness of accidents through the media.⁴⁰ In addition, self-efficacy may also generate a problem-focused attitude towards health risks, which may also contribute to a higher awareness of accidents. Again, the role of self-efficacy in other types of risk perception is negative. The findings presented in this paper should be considered in light of some limitations. First, the reliability of the sum scores of certain scales were not too high (0.61 for future-orientedness and 0.68 for social comparison). In addition, we used ordinary (and not interval level) scales as dependent variables in multivariate regression analyses. Finally, due to the cross-sectional study design, cause and effect relationships cannot be determined. Therefore, results may be interpreted in light of these issues.

We may conclude that besides behavioral influences, psychosocial variables also play a role in adolescents' risk perception. This influence, however, depends on the nature of behavior. These findings also draw our attention to differences in the development of risk perception. For example, substance using behaviors or transportation behavior may have different structure of influencing factors since adolescents may use different risk management strategies. These results also suggest that behavioral and psychosocial (attitudinal) influ-

ences of health risk perception should be an important topic of research, mostly because we know much less about their development. More research is needed to clarify the mediating effect of the specific psychosocial factors (both personal and social) and sociodemographics, such as age, gender or the family's socioeconomic background. Future research should also focus on a complex model of risk management strategies including both risks and „benefits” of a health risk behavior. In order to help adolescents make favorable health decisions, we need to know the risks as well as benefits (as perceived by them) of a health risk behavior.

All in all, we aimed at drawing attention to the importance of adolescents' risk perception in public health. A clear implication of the research is that adolescents would benefit from interventions that empower them not only knowledge but also skills to manage risks and behaviors. Although adolescents usually consider themselves to be well-informed about health risks, they lack the necessary life experiences to make appropriate decisions.²⁰ Interventions should take into account the complexity of adolescents' decisions and teach them skills that enable them to behave in an assertive way. Adolescents may have difficulties in making sense of complex decisions and keeping track in their details. This may lead to quick and impulsive decisions despite an awareness of the health risks.⁴¹ Our results also suggest that life-skills training should become an integrated part of a health promotion program.⁴² Enhancing adolescents' competence, that is personal agency and social mastery (e.g. teach them effective coping skills and hostility management and help them develop a positive approach to life and the future) may enhance their health consciousness and life satisfaction.

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Address for correspondence

Bettina F. Piko, MD, PhD
University of Szeged
Department of Psychiatry,
Division of Behavioral Sciences
6722 Szeged
Szentharomsag street 5.
Hungary.
Tel./fax: 36 62 420-530
E-mail: pikobettina@yahoo.com